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Cooperation: An Appeal for Breadth of View in Medicine*

VICTOR COX PEDERSEN, A.M., M.D., F.A.C.S.

New York

The dictionary definition of "co-operation" may be abbreviated to read: Association of persons for common benefit, or collective action of persons for common well-being. Essential to success is agreement in mind, purpose and action. Concurrent co-ordinated effort is also co-operation in social or economic, moral or religious, educatinal or political, legal or medical, and official or personal fields. It is the effort of accomplishment because each co-operating individual subordinates himself to the common and worthy welfare.

My general criticism of most presidential addresses, constructively, is that they deal with a single topic, usually scientific, and do not review the broad field of the organization's work and do not present progressive creative recommendations.

In preparing my Presidential Address a research worker reviewed all these documents from the beginning tc the present period of our Association and has reported as follows: In some years there exists no printed Presidential Address. In other years the Address is so casual as to resemble extempore notes. All other Addresses emphasize history or science, formally or informally; none sets forth a definite progressive policy; none contains recommendations for adoption by the Association, and, most important, none combines these four features: (1) history; (2) science; (3) development and (4) recommendations.

It is my purpose to devote a section of this Address to each of these four subjects.

The American Electrotherapeutic Association collectively and individually is interested in co-operation in medicine as an art and science and co-operation of fellowship both within itself with the medical profession-at-large as emplified by history, science development and policy recommended.

In this interest our Association is like all other medical organizations. In fact a sound preliminary thought for consideration is that the greater, broader and deeper this general interest is the larger the growth, the wider the influence, the sounder the progress and the more permanent the results of our work. We cannot stand aloof; we cannot work alone; we cannot hide our activities and deserve or attain recognition and success.

I. Cooperation in Medicine: Historical and Scientific

Co-ordinated co-operative effort in medicine must be based on due and accepted knowledge of the chief principles underlying each specialty. The best status of the physical therapist is not that of a specialist but that of a liaison officer, because his activities cross all specialties, his functions are distributed, and his services general throughout medical science. His basis must be acknowledgment and obedience to principles established in each specialty, otherwise he has no orderly agreement or co-operation of effort with that specialty.

An exact example of that which is meant is the attitude of some of our Fellows. In dealing with thyroid enlargements, they concur with the dictum of General Surgery that usually a removal is required where there is tumor. This is correct co-operation. In dealing with the prostate, however, they deny the teaching of Urology that a cystoscopy should always be done unless there are positive contra-indications so that the obstructive relation of the prostate to the floor and outlet of the bladder and ureters shall be absolutely known. Therefore, their diagnostics

* Presidential Address delivered before the American Electrotherapeutic Association at its Annual Meeting, September, 1926.

of the prostate are impericism, estimation and guesswork. The one outcome is a disquieting doubt and practical disproof of their statistical reports. Rectal touch is far from conclusive because a prostate may project backward into the rectum but leave the floor of the bladder almost normal. Prostatic enlargement often obstructs and alters the bladder with rather little positive change in the rectum. It is useless to disregard the principles of a specialty because it is not possible to evolve and establish principles in independence and conflict with the experience and teaching of years and large numbers of skilled specialists.

A strange complex with regard to these Fellows is that they frequently lament the converse of this proposition that the medical profession at large has not co-operatively accepted the teachings of Physical Therapy for years. Does it represent a sound judgment to complain of that which they themselves practice, namely indifference to the teachings of others?

Owing to the demonstrations and experiences of the war and further to the development of accurate and adequate apparatus, and finally to the establishment of sound methods in Physical Therapy, the relation of the outer medical world to Physical Therapy has been materially altered during the last seven years. Recognition as well as co-operation are now the rule even in the laws of many of our sovereign states.

Therefore, co-operation is present in medical literature, medical schools, hospitals and medical organizations. The history of the whole matter is one of doubt not trust, exception not acceptance, and dissension not harmony. How misleading is that streak in human nature which causes us to dislike and resist that which we do not know. How much greater would have been the progress, the benefit to mankind, and to medical science under true co-operation.

This prejudiced attitude is by no means abolished. The Dean of a Medical School and the President of a Hospital Medical Board openly regard Physical Therapy as unreliable—perhaps unworthy. Opinions such as these are not co-operation, because they are speaking of that which they have never themselves investigated and then judged.

The situation is changing like the weather after a storm. Plants are sprouting and blossoms developing. Soon will come the fruit, the harvest and the feast of accomplishment for mankind.

First, medical literature. Never before have editors been more anxious than for contributions of all types on Physical Therapy. The fear is that the lack of knowledge on the part of editorial staffs may make cautious study of the articles often difficult. Nevertheless, papers and abstracts are much more frequent and book reviews are much more fair, broadminded—and accurate.

Second, medical schools. Departments of Physical Therapy with individual organization and sphere are still very rare. Perhaps strictly speaking there is hardly a single example in the United States. The more common arrangement is to combine and subordinate Physical Therapy with another department. Let us not be discouraged. Gynecology was once a department of Surgery. Urology is in most institutions still governed by the surgical staff. Nevertheless it is slowly and surely coming into its own authority and will fully do so during the present generation. It is unscientific to require that a specialty carry the responsibility of diagnosis, foretreatment and aftertreatment but to pass the operations as such to the general surgeon.

A real difficulty in the establishment of Physical Therapy Departments in medical schools is the large floor space required for demonstrating apparatus and technique. This demand has far outgrown all expectations and until our medical schools can reorganize their rooms to meet the problem, a compromise and co-operation will have to prevail.

Third, hospitals. The Physical Therapy service, as such, is not yet recognized in Medical Boards but this coming event casts its shadow before through the obvious co-operation and co-ordination with Physical Therapy by the departments of Medicine, Surgery, and specialties. Again the obstacle of restricted floor space is encountered and the balance of co-operation among ward service and outpatient department or other facilities. Rooms for rest or recovery immediately after treatment are certainly advisable if not essential. All this develops a wonderfully correlated organization. One needs only to visit such an establishment as the Battle Creek Sanitarium to have all this indelibly impressed. Yet adaptations of their far-reaching methods and highly developed plant are exactly what the average hospital must acquire, otherwise it will be playing at Physical Therapy.

Fourth, Medical organizations. Co-operative spirit is behind invitations to our Fellows to present solitary papers or portions of symposiums or discussions. It is a wholesome sign that the number of these programs is slowly and steadily increasing.

Further, contributions-at-large in Physical Therapy by physicians who are not Fellows of this Association are beginning to appear. Again the problem of proper selection of authors and matter is supreme for organizations exactly as it is for editors.

II. Science

Within our own private circle for co-operation is the problem of systematically having our Fellows present papers before appropriate Sections of the American Medical Association. Your Secretary and President both by personal contacts have developed the reasonable willingness of the Chairmen of several Sections to accept such papers. In order to co-ordinate our own efforts with the known policies of the American Medical Association, the President sent out a circular letter requesting co-operation by the Fellows, first in terms of preparing the papers, and second in terms of submitting abstracts, so that for the program of 1927 of the American Medical Association every detail of correlation would be properly fixed. An amazing fact is that up to the date of preparing this Address, exactly three of our Fellows had complied and co-operated. If this means that only three papers will be presented, then the representation is inadequate and co-operation by the Fellows has failed. This failure is serious because this is the first year in our history when the Officers and Section Chairmen of the American Medical Association are avowedly ready to let us make good. If this means that the Fellows prefer to deal with the American Medical Association directly then co-operation has again failed and your Secretary and President are placed in the light of having individual members ignore the plan arranged through the said Officers and the said Section Chairmen. Such absence of co-operation in this way is always one of the causes of limited progress. No organization can expect to make real advance unless the plans instituted by its officers, as these were, are followed consistently, persistently and honestly.

My letter of February 2, 1926, to Dr. Olin West, Secretary and General Manager of the American Medical Association had his approval. It contained the following details in this matter:

"Without knowing all that I might know or should know as to how the programs of Sections are arranged, the following plans seem to me at this writing to be the

best for development by our Board of Trustees for our own members.

1. If a paper has a definite bearing on one of the departments of medicine, then that paper should be read before the section devoted to such department of medicine. Example: Physical Therapy in the Treatment of Fractures, should be read before the Section on Surgery.

2. If a paper deals with the general subject of Physical Therapy through a special modality and as definitely applied to therapy in general, then such paper should be read before the Section on Pharmacology and Therapy. Example: Physical Therapy in Comparison with Other Methods.

3. If the paper is concerned with the physics of a definite method of Physical Therapy, then it should be read before the Section on Miscellaneous Topics. It would seem to me that this particular Section might be the outlet for many of the formal reports of the Council on Physical Therapy."

Co-operation among our own Fellows was instituted in accordance with suggestions made by me at the last Annual Meeting for the rewriting of the reports of our Standing Committees going back many years, so that the new titles would be in the nature of titles of medical articles followed by the caption that the contribution is the report of a definite committee for a specified year. It looked as though this movement would be successful and attain its aim, which was to bring before the reading medical public through the Index Medicus of the Carnegie Foundation and the Quarterly Cumulative Index of the American Medical Association all the most valuable work of our Standing Committees for years back. The plan, however, was shattered by encountering the stone wall of bibliography that no indexing whatever can be retroactive. In other words, indexing for the year 1926 cannot possibly be made to cover subjects before the medical or scientific world in even as late a year as 1925, saying nothing possible about more remote years even though the titles be new and distinctly different. Hence this co-ordinated effort ceased through no fault of its conception, inception or development. Those Fellows who began to do this work are hereby tendered my personal and official thanks.

In a various sense our Standing Committee Reports are connecting links with the medical world because they usually contain much progress and development. Most distinctly in this way is the *Committee on Nomenclature*. The International Congress on Electrology and Radiology has appointed a similar committee for positive co-operation with our own committees both in the New York Electrotherapeutic Society and the American Electrotherapeutic Association, so that scientific terms shall be standardized throughout the world in our sphere of special endeavor.

My former schoolmate, Professor Clarence H. Young, of the Department of Greek Language and Literature, Columbia University in the City of New York, invoked the aid and furnished introductions to Professor E. H. Sturtevant of the same department in Yale University. This relation placed upon your President the essential obligation of the initial correspondence as to two terms already under long discussion—endothermy and diathermy. Dr. Papathopulos P. Nicholas, a member of the same committee in the New York Electrotherapeutic Society as a Greek of culture, worked earnestly in this correspondence with Professor Sturtevant. In the end of it all the papers were turned over to the Chairman of our own committee. Co-operation with the International Congress is important. This committee in previous years has done little or nothing, but should this year have a stirring and important report, which should forthwith be forwarded to Europe with a request for an exchange of reports so that combined judgments will be the outcome.

The double or converse relation between the older and younger group of Fellows and Life Fellows should be carefully discussed. It may be suitably emphasized by the inauguration of a system of prizes, which may be awarded annually or biennually to those physical therapists of proper standing who have not, for example, been out of the medical school more than ten years, or such a restriction may be omitted and the field opened to the whole profession. The prizes could be $150, $100 and $50, for the first, second and third contribution of merit in the general field of Physical Therapy or on any subject set by this Association through its Board of Trustees. Any plan of this general nature will mean that the American Electrotherapeutic Association is holding forth both its hands in the effort to co-operate with the rising generation to serve mankind. I commend the plan to this meeting and trust that it will be adopted at once and continued permanently. As this Association increases in numbers, the money value of the prizes could easily be increased.

As part of this system of prizes any of the Standing Committees through the Board of Trustees or the Board of Trustees itself could formulate a problem whose solutions will receive the prizes. All this means activity and accomplishment.

The field of Physical Therapy has been extended so widely and so suddenly during the last five years that organization and centralization are required—not in an arbitrary or coercive sense but in a cooperative coordinating sense by affiliation. I feel that as the first of all electrotherapeutic societies the American Electrotherapeutic Association should be the central and chief body, just as the American Medical Association is central and chief in its contacts with its state and county societies.

Affiliation has come to stay. All that it needs is a proper foundation, superstructure and roof, and suitable accommodation within the building for all concerned. Each, every and all rights must be preserved and observed with absolute equality, without fear or favor, not only our own as those of the American Electrotherapeutic Association as the senior organization, but also those of the organizations requesting affiliation or accepting invitation to affiliation. Several such are numerically larger than our own probably because their attitude is much more modern.

A theory has been advanced that this Association can initiate, culminate and terminate all these relations more or less at whim and will. Nothing of this kind is possible. All the relations must be on a share-and-share basis, equal and alike each to each, otherwise there will be no affiliation possible because otherwise there will be no co-operation possible.

The American Electrotherapeutic Association cannot play the part of the Eskimo male who takes on a wife every two years and drops her for a consideration sometimes as little as a pouch of tobacco, a jackknife or a harpoon.

This organization must absolutely respect autonomy, independence, liability, representation and geographical determination.

A very important element of affiliation is the development in every possible community of a local Physical Therapy society or club. The new President and Board of Trustees should be requested and empowered to appoint one active Fellow or a committee of Fellows in such community to institute the local society and make an official report in 1927. The Committee on Informa-

tion and Publicity is organized for this work and may very well indeed have it assigned to it. Thus needless reduplication of committees will be avoided.

Such then in brief review is our first subject—co-operation in medicine.

II. Co-operation in Felowship: Development and Progress

1. Development

The American Electrotherapeutic Association began in 1890, and credit belongs to the builders who chose the site, dug the foundation, and erected the building. One might say, so far as the exterior is concerned. Such men are Morton, Massey, Snow, DeKraft, Titus, Morse, and many others, too numerous to mention in an address not wholly historical. Owing to the failure of co-operation on both sides, those of the outer medical world and those of these honored founders this building stood for a long time in a lot by itself. Now, however, avenues have been laid, side-streets cut and the neighborhood of that building is growing with enormous rapidity so that a neighborly spirit toward Physical Therapy is rapidly developing on the part of ourselves and the new neighbors, namely all other branches of therapy.

The majestic building which our older men have skilfully erected is being occupied correctly by a new generation. Youth will not be denied. It is said that after one of the great victories of the Greeks over the Persians when the victorious army returned and marched through the amphitheatre, the populace rose as one man to salute the youth of the nation, and so in our late war the bulwark of all the nations was the group of human beings from 20 to 45 years old.

In our case the youth of Physical Therapy are the men who are receiving the appointments in clinics and hospitals and positions on the teaching staffs—both as they rightly should. This Association must follow this example in the outside world and grant to the youth in our field of scientific endeavor absolute recognition in the highest councils of the organization. This means that the younger men who constitute the officers must be voting members of the Board of Trustees and must equal this position in every other sphere of endeavor.

Continuing the figure of speech of the building erected, the activities of the younger men are furnishing the decorations and equipment of the building. All these procedures essentially go on with the guidance of the designers and the builders but not to the exclusion of the occupants. If, for example, the designers and builders literally exclude the dwellers, the logical outcome will be that the latter will erect a building of their own.

Let every one understand the fulness of admiration and the depth of credit due the builders. A history of this Association is now being prepared by those who can do so from first knowledge and not from hearsay or dry records. Co-operation requires that every Fellow purchase a copy as soon as the work is completed. Another type of recognition of the older generation will be a system of Annual Testimonial Dinners devoted each year from year to year to one of these noted and beloved pioneers in regular order. This same generous tribute should be the regular policy of all medical organizations toward their senior members.

Added to these normal tributes will be the proper co-operation between the two groups as far as one may recognize groups. Neither can properly exist without the other or obtain its best results without the other.

2. Progress

Another form of Fellowship co-operation is the reorganization that is absolutely required. In nearly every community there is a building or other venture usually going back many years and pointed out as someone's folly. It usually stands alone, segregated and ostracized. So this organization may be guilty of erecting a similar folly unless it is realized that in the affairs at large there must be absolute co-operation and equality of recognition. Not only must there be co-operation with the whole medical world but co-ordination of all internal activities, otherwise the effort will be similar to an endeavor to run a modern railroad engine on old-fashioned iron-bound wooden beams for rails.

Inasmuch as the younger men are those who have received the recognition in hospitals, clinics and medical schools, they are the staff officers functioning between the commanding officers and the rank and file of the outside world, comprising officers (other practitioners) and enlisted personnel (nurses and technicians) and civilians (patients). Wise indeed is that commanding officer who gives to his staff due consideration, recognition, and reward, and so far as circumstances permit extends these principles to his subordinates in general. The staff exists to give help and voice in the organization of the headquarters. Within our own organization the advisory and guiding hand remains with the senior men only if they temper the guidance with due consideration, recognition and reward. "No parable may travel on all fours," thus say the clergy. The present figure and comparison cannot and does not inclusively and exclusively cover all possible phases of the subject before us, but the secret of our success will be co-operation exactly as it is in military organizations.

Previously in this address, I have urged the wisdom of honor and homage to the senior members while they still abide with us. Nothing can have finer sense, taste and foresight, but there is the converse of this proposition which has not perhaps occurred to one person in this audience, and here it is. It is very much the function, the duty and the privilege of the same senior men during their own lifetime to recognize the rising generation. In other words, full co-operation, recognition and co-ordination between these two groups now, before those of us who are no longer young, like myself, move entirely and forever off the stage is the one sound doctrine of co-operation, progress and stability. Yet in a large measure as I see it, there is nothing directly in the policy of this Association which makes fixed and definite effort to produce this result. I believe that I may truthfully say that the absence of this policy as an actuating force is one of the reasons why this Association has not progressed as much as it deserves. By no means is the hour too late provided we here and now at this annual gathering proceed to turn over the pages of progress in the correct order of reading. Let us be like the merchant who admits his son to full partnership so that he may so learn the business management that it progress and succeed in continuity.

We must be governed by co-operation, conference and cosultation, and furtherfore, the technicalities of any question must give way to the merits of the same question. Our basic organization is wrong, because it consists of three instead of two elements. The three factors are (a) the general officers, a created body, almost in a detached relation; (b) Trustees, a created body exclusive in most of its relations from the officers, and (c) the Association or creating body.

The officers have no vote in our affairs in the meetings of the Board of Trustees in all ordinary circumstances. How restricted the policy whereby such officers as our treasurer and our secretary, who have been definitely identified with the details of the association life for years, are excluded from a vote in the council of the Association! Thus these men are converted to pure de-

tail workers, and the loss of co-operation in their particular cases is a definite loss to the society. Such a policy cannot be called constructive, progressive, productive or desirable.

Exactly the same arguments apply to the voting membership of the ranking vice-president, in the Board of Trustees. The principle seems to have prevailed in this Association that the Vice-presidential office is ordinarily given as a compliment, more or less irrespective of direct qualifications for the presidential office. If this statement on hearsay is correct in fact, then our plan has been directly opposite to that recommended in works on parliamentary procedure, to the effect that a vice-president should be chosen solely with reference to his capacity for presidential duties.

There is no doubt but that our present system is out of balance because it is in fact a three-unit system. Competent legal opinion from a half-dozen sources has been had that the one simple effective organization is the two-unit system consisting of the Association as the body of authority and the officers and trustees as the subordinate body of agency, in which every member has a vote, because as Robert's Rules of Order say, "Executive Committees, Board of Trustees, and the like, are small deliberate bodies." The Anglo-Saxon underlying principle therein is that every member thereof should have a vote.

In contrast consider the New York Academy of Medicine. It is one of the great medical bodies of the world. Much of its greatness is due to the consistent wisdom of its council—a body of twenty-one comprising all officers, all trustees and all chairmen of standing committees. Small wonder that its decisions are representative safe and sure and that its policies are sound and stable!

Co-operation practically implies concentration and simplicity of organization, and these are always best.

There is, in my opinion, nothing before this Association at this Annual Meeting of equal importance to the adoption of the new Constitution and By-Laws because they so adequately provide for all the development reviewed in this address and required by our experience. All their underlying principles are sound and based on age-long experience as exemplified by Rules of Order enforced in our own House of Representatives in Congress. For us, nothing can be safer, saner, surer or sounder.

The report of the Special Committee on Constitution and By-Laws is already before you and is too lengthy for physical inclusion in this Presidential Address, but as an executive relation, I desire it to be regarded as a part of this Address.

III. Recommendations

As far as I am aware I am the only President who began his term of office by submitting to the Annual Meeting, in September, 1926, various recommendations, which are:—

1. That the Standing Committee on Nomenclature prepare its research and co-operate with the same committee in Europe.
2. That our Association co-operate actively in all Physical Therapy with the American Medical Association.
3. That a style of titles of Standing Committee Reports be hereafter used which will secure them indexing in the libraries as papers.
4. That a proper budget for the Standing Committee on Information and Publicity be voted.
5. That a proper budget for the publication of the History of the American Electrotherapeutic Association be voted.
6. That a Special Committee on Constitution and By-Laws be approved and empowered.

This address embraces, as it should do, a report to you of each of these matters—which are at least in the process of accomplishment, except that of the Amendments to the Constitution and By-Laws which must essentially await the action of the Annual Business Meeting two days hence.

Similarly I desire to lay down my office with two far-reaching recommendations: 1. That all such policies should receive full publicity by coming before the Association as a whole and full settlement by co-operation on the part of each Fellow and Life-Fellow. 2. That we depart from our custom of not discussing or making motions on the points of a Presidential Address, where its structure and matter warrant. In the American Urological Association a unanimous vote was given to a recommendation in a Presidential Address that a special study be undertaken by the Association each year. The spirit and practice of this recommendation have added enormously to the progress of Urology ever since—now fully ten years. Wise will we be if we follow this custom henceforth.

The aim of this Presidential Address has been to bring together on a common basis of good-will and co-ordination all elements concerned. Opinions must differ but those who are wise agree to disagree, and emphasizing the agreement and not the disagreement, remain at peace and in fineness of feeling among themselves. This is another far-reaching element of co-ordination, in behalf of which I strongly appeal to every one of you.

I cannot close these brief remarks without acknowledgment and gratitude for the support given on all sides during my term of office.

45 West 9th Street.

The Alaska Medical Service

The Government's duty to care for the health of the aboriginal races of Alaska is performed by the United States Bureau of Education through its Alaska medical service. The task is a formidable one because of the remoteness of most of the villages, the enormous distances between them, the meager means of communication, and the severity of the climate. The 27,000 natives are scattered along thousands of miles of coast and on the great rivers, in villages ranging from 30 or 40 to 300 or 400 persons. Many of the settlements are far beyond the limits of regular transportation and mail service. Some of the villages on remote islands or beside the frozen ocean are brought into touch with the outside world only once or twice a year, when visited by a United States Coast Guard steamer on its annual cruise or by the supply vessel sent by the Bureau of Education.

Hereditary diseases are much in evidence among all of the tribes. Tuberculosis in its various forms, pneumonia, and trachoma are most prevalent. Epidemics of smallpox, influenza, and measles have frequently taken their toll of hundreds of lives.

The Bureau of Education maintains small hospitals at Juneau, Kanakanak, Akiak, Tanana, and Noorvik, which are important centers of native population in southern, western, central, and northern Alaska, separated from each other by many hundreds of miles. Each hospital is a center of medical relief for a very wide territory.

Industrial Lead Poisoning

A survey of lead poisoning conditions in the lead mining industry of Utah, has been conducted by the Bureau of Mines, Department of Commerce. The survey, which was at the request of mine operators and miners, covered a period of two years, and indicated lead poisoning rates of 0.83 and 0.50 per 1,000, for the respective years, for the entire population of the State.

Virtually all lead poisoning at mines is contracted through inhaled lead ore dust, according to Dr. Arthus L. Murray. The carbonate ores are the most frequent cause of lead poisoning among miners. The sulphide ores may cause lead poisoning when mined dry in poorly ventilated places. Lead poisoning in mining can be reduced to a minimum by efficient ventilation, wet drilling, and the sprinkling of muck piles before loading.

Stricture of the Ureter

WINFIELD SCOTT PUGH, B.S., M.D.,
FROM THE UROLOGICAL DEPARTMENT, CITY HOSPITAL
New York.

Introduction

If there is a subject that has been the center of more controversy than ureteral stricture, we confess not to know of it. In some of our meetings the entire sessions have been devoted to ureteral stricture. Its proponents have been severely criticised openly in some, in others by innuendo. Like all other subjects its pioneers perhaps have been a little hasty in the diagnosis, the opposite effect also exists. By this we mean its opponents have been slow to recognize it. We believe, however, that stricture of the ureter is a definite pathological entity and take this opportunity to submit our views.

History

For a proper classification of strictures it is necessary to divide them into congenital and acquired. The former have been well known and considered for a long time, and are fully discussed in the papers of Bottomley,[1] in the earlier writings of Eisendrath[2] and particularly well brought out in his recent article.[3] In this paper we are particularly interested in acquired stricture, the history of which is strange to say, very brief. Our attention was really first called to it by Kelly[4] in 1902. In his epoch-making contribution, that writer makes this significant statement, "It is not a little strange that although enough has been written about stricture of the urethra to fill volumes practically nothing and next to nothing practical has been said of stricture of the ureter." The work of Kelly marks the beginning of our studies in ureteral pathology and particularly as applied to stricture.

It however remained for the first publication of Hunner's[5] in 1916 to give the necessary impetus to the study of this lesion and its consequences in causing kidney pathology. To state that this subject has stirred up discussion in recent year is putting it rather mildly. Attempts to substantiate or disprove the claims of Hunner has however developed a large mass of interesting material.

Professional Attitude on Stricture of the Ureter

In visiting the large European clinics one is particularly impressed by the fact that he seldom if ever sees cases diagnosed as stricture of the ureter. Further one will not find ureterograms depicting. In many cases the continental surgeon when asked about the subject will shrug his shoulders at the mention of the title, or actually deny its existence. On more than one occasion we have heard it spoken of as the morbus Americani. There are several reasons for this attitude; in the first place roentgen pictures are not so readily available as they are here. Second, one will rarely find an x-ray outfit as an integral part of the urological section, or at all handy. Aside from the above certain techniques of ureterography as developed in this country are practically non-existant in Europe.

In America as well as in Europe there has been an unfortunate reluctance to accept ureteral stricture as a distinct pathological entity. It is to be particularly regretted that this feeling exists in a clinic or two that are among our largest, as such opposition carries considerable weight in retarding progress.

Anatomic Considerations

In order that we may the better grasp the pathological anatomy and physiology of ureteral stricture, it will be well to review briefly the normal anatomy and physiology of these extremely important aquaducts. The ureters are musculomembranous tubes, one on each side of the body extending from the pelvis of the kidneys to the ureteral orifice of the bladder.

The length of the tubes vary considerably in different individuals but anatomists generally state their length as from 29 to 32 cm. The left ureter is generally a little longer than the right as the latter is somewhat crowded by the liver. One frequently hears the ureters spoken of as retroperitoneal organs. This is essentially true but requires a little more explanation than is usually allotted.

The ureters drop down from the kidney pelvis for a short distance in which they are supposed to be suspended; this is however usually but a few inches and they become attached, or in many cases seem to be incorporated in the posterior layer of the peritoneum. The ureters when empty are collapsed, appear flattened and on section the transverse cut presents a stellate appearance. The diameter of the tube is frequently given as ½ cm., but this is by no means uniform. In looking at the ureter we also notice several points of normal constriction, due to the circular group of muscles. That first noted is at the uretero-pelvic junction, the second where they pass over the iliac vessels and the third in the intravesical portion of the ureter. In women there is also a constriction where the ureters pass through the broad ligaments.

The ureter on close examination is found to consist of three coats, an external fibrous, a middle muscular layer, and the internal layer or mucosa. The outer investment is rather loose and becomes a little denser as the ureter nears the bladder. The muscular portion is made up of an external and internal longitudinal layer. The mucosa is lined with columnar epithelium about four cells deep.

The arteries which supply the ureter consist of branches from the renal artery and the afferant or extra renal arteries as described by Eisendrath.[6] These afferant vessels incidentally are quite a little more frequent than most of us have seemed to realize and should always be thought of in connection with renal surgery. In the middle of its course the ureter receives branches from the ovarian or spermatic arteries and toward its terminus small branches from the vesical arteries.

Lymphatics. These vessels are found mostly lying in the adventitia and muscular layers and usually accompany the arteries. They form a rather complicated meshwork about the ureter and are said by some to be important factors in the production of ascending pyelitis. Now just what relation do the ureters bear to the surrounding organs. Aside from their relationship to the posterior layers of the peritoneum which we mentioned, they really have no definitely fixed course and relations.

The ureters would however seem to lie just beyond a line denoting the tips of the transverse process of the lumbar vertebra. In front of it we have the peritoneum and the large and small bowels. Posteriorly we have the psoas muscle and it crosses the genito crural nerve. The spermatic vessels usually pass in front of it. It is also

in fairly close relationship to the aorta and vena cava. When the ureter reaches the pelvis it crosses the common iliac vessels close to their bifurcation and on the right passes beneath the cecum. Note well this last mentioned relationship as it is of very great importance in diagnosis. Right here we frequently have stricture and the lodging of stone. This fact is responsible for many an appendix losing its happy home. The ureter

Fig. 1.—Stricture of ureter. Pelvic fracture opposite second lumbar vertebra.

enters the bladder wall very close to the seminal vesicle, and toward the middle line. This relationship must be noted in the performance of seminal vesiculectomy or other operations in that area.

Physiology

The normal function of the ureter is to receive the urine from the kidney and conduct it to the bladder. The normal capacity of the ureter is from 1 to 5 cc., while that of the kidney pelvis may vary from 2 or 3 cc. up to 20 cc. or more.

During the passage of urine the ureter undergoes a series of vermicular contractions starting at the pelvis, traveling at the rate of 20 or 30 cm. a second. From three to six contractions take place every minute. Peacock[7] in studying ureteral contractions found that a series of swellings of from 2 to 5 mm. long are seen along the course of the ureter during its contractions, due to the filling of the tube with urine. These contractions may also be produced by foreign bodies as stones; strictures also produce them. Temperature, blood pressure and the nervous mechanism have a marked effect on ureteral peristalsis. Bodily position has no effect, however, nor does overdistension of the bladder. Reversed peristalsis was long a disputed question but the researches of Lewis and Goldschmidt[8] have quite definitely established its existence. This phenomena has been demonstrated also by urographic pictures. In connection with the movements of the ureteral contractions urine is forced into the bladder. The way in which it is extruded depends largely on the propulsive power behind the stream as well as the shape of the ureteral orifice. On watching a fairly large round or oval opening it is at times almost impossible to see the extrusion of urine. In the small openings there is often a distinct wave seen and the urine is ejected with force. The current on discharge may be propelled in almost any direction. In this connection Caulk[9] has told us quite a little regarding the uretero vesicle valve. Many question the existence of this valve and in a number of cadavers examined we were unable to identify it. Very distinct spasmodic action is often noted in normal ureters and one must be rather careful at times lest this condition be diagnosed as stricture. This will often be noted on attempting to catheterize a ureter for the first time; relaxation usually overcomes it.

What is a Stricture of the Ureter?

In teaching cystoscopic and ureteral technique one is quite frequently asked the question just what is a ureteral stricture. With all due respect to those who have done such impressive work on the question of ureteral stricture we must adhere to the fact that there is (as we have previously noted) such a thing as ureteral spasm, which will at times greatly interfere with our examinations. It is a similar condition to that in which one sees in the urethra at times upon passing a sound or other instrument. At times the resistance is so great as to make us think they are strictures, but a little pressure usually overcomes them. These may also be noted anywhere in the course of the ureter. A real stricture is a definite permanent pathologic intra-ureteral obstruction which is present at a particular location and never varies from it and is demonstrable not only by means of a specially prepared catheters or bulbs, but by the ureterograms as well. In the pictures we should see a definite diminution of the ureteral lumen.

Incidence

Hunner who has certainly done more work than anyone else on this subject, in one of his late articles states that he has seen 2,000 cases in eight years.[10] In an examination of several sets of urological records we have found stricture of the ureter noted as from zero percent up to about 20 percent. In a very broad experience in urological work we seem to have found stricture present in about ten percent of cases requiring ureteral

Fig. 2.—Well marked stricture as shown by arrow opposite the third lumbar vertebra.

examination. Race or social status do not seem to have any bearing on the subject. They are apparently slightly more frequent in the female than in the male, and in all of our cases were noted between 20 and 40 years of age.

In our series of cases the following table approximately represents the incidence according to age:

Below 20 years.....	none
20-25 years.....	26 precent
25-30 years.....	28 percent
35-40 years.....	23 percent
over 40 years.....	23 percent

according to sex

Women ..... 53 percent
Men ..... 47 percent

Etiology. In discussing the etiology we may divide the cause of stricture of the uterer in traumatic, into that caused by other infectious processes, the so-called focal lesions and that due to direct extension of disease processes.

Traumatic strictures are most commonly incident to childbirth injuries, or the performance of extensive gynecological operations; as the Wertheim amplified operation and other similar procedures; these are usually located close to the bladder. They may also follow vesical fistula. In view of the fact that the ureter is not a fixed, but easily movable organ, other traumatisms are really rare particularly stab and gun shot wounds.

Fig. 3.—Stricture of ureter opposite second and third lumbar vertebra. Additional stricture is present in right sacro iliac region.

The discussion of focal infections has been most extensive and was first spoken of by Hunner in 1909,[11] If practically every acute infection may produce a focal lesion in another organ there is no reason why it should not occur in the ureter. One of the diseases especially emphasized by Hunner is tonsillitis. Many people, however, have tonsillitis without lesions appearing in the ureter. In almost all of our own cases there was a record of some previous acute infectious process, often an infectious febrile disease or the exanthemata.

In an examination of 60 consecutive cases of stricture of the ureter—

History of Influenza was noted in	22
Scarletina	9
Variola	3
Typhoid fever	15
Pneumonia	10
Cerebro-spinal meningitis	1
	60

Tubercular processes are positively causes of ureteral stricture. Pyorrhea alveolaris has also been noted as a cause of ureteral stenosis. Such diseases as tonsillitis and pyorrhea are so very frequent that they might well be included in the etiology of most anything. In the military services where tonsillitis is common, ureteral stricture is seldom noted and those who have had repeated tonsil attacks have been under observation for many years.

To what extent is the gonococcus an etiological factor in stricture of the ureter? Kelly's[12] early work suggests that he regarded gonorrhea as a common cause and then apparently changed his opinion. Venereal history is denied so often that when we see a lesion looking suspiciously like a gonorrheal condition, question no further but treat accordingly.

One should rather expect to find the gonococcus as a cause, particularly in women where as we all know these infections have a much greater tendency to spread by the urinary route than they have in men. Garceau[13] believed the gonococcus to be the cause of the denser form of stricture. Hunner[14] does not lay much stress upon the gonococcus as a cause. Those of us however who have seen gonococcus infections by the thousands know full well that the Neisserian infection will invade every single area of the genito-urinary tract and we are consequently bound to consider this highly important organism as a factor in the etiology of any disease of these tracts. We have seen quite a few cases of gonococcus pyelonephritis, as well as ureteritis. The diplococcus of Neisser is an intense irritant and by no means the organism least capable of producing fibrous tissue. Wossidlo[15] has also noted numerous cases of gonococcus pyelitis and ureteritis. He also quotes numerous other authors as Mendelssohn, Asahard, Lewis, Marcuse, Casper, Pollitz and Gerster. From cases we have personally observed it is our opinion that the extension of a gonorrheal process from the urethra to the ureter is, at least in the majority of cases by continuity of tissue and not by lymphatic conduction. In these cases the sequence is urethritis, trigonitis, ureteritis and stricture. It is not by any means our intention to state that the gonococcus is the most common cause of ureteral stricture, but believe it is no uncommon factor in that disease. In this connection the following case will be of interest.

S. E., male, age 32. Engine man. Seen January 2, 1924. Chief complaint, pain in left lumbar region. Family history unimportant.

Fig. 4.—Strictures of the ureter at juncture of the ureter and kidney pelvis and opposite the body of the fifth lumbar vertebra. Hydronephrotic Kidney.

Previous personal history. Aside from the fact that he was operated on for hernia about three years ago, his general history is clear.

Previous urological history. Had an acute gonorrhea about four years ago, another about eighteen months ago and thinks he was cured of both.

Present condition. Patient states that about three months ago he began having frequent attacks of pain in the left lumbar region. The pain was sharp and lancinating extending anteriorly as far as the glands

penis. He frequently voids urine hourly and at times half hourly. Nocturia two or three times nightly. Urine is usually cloudy and often after sharp painful attacks it will contain considerable blood. Attacks are often accompanied by chills and fever, but these are not constant. No other symptoms are apparent.

Examination shows a large well nourished man. General physical examination is negative except that pain is elicited on pressure in left flank. Urine is cloudy, contains many flakes S. G. 1028, albumin and pus present, few R B C. Prostate enlarged and mushy. Vesicles

Fig. 5.—Marked linear stricture of left ureter, opposite the disc between the third and fourth lumbar vertebra.

enlarged. Prostatic fluid contains much pus and some gonococci.

Urethroscopy: numerous glands in anterior urethra show pus. Old hard infiltration noted at bulbo membranous junction.

Colliculus is markedly enlarged. Left ejaculatory duct exudes a little pus. Purulent material issues from several prostatic ducts. Sphincter area shows considerable injection; marked trigonitis extending well up around left ureter. A slight amount of pus exudes from left ureter. On passing a number five catheter it met with a very distinct obstruction at about 10 cm. from the meatus. On withdrawing catheter it was found to contain considerable thick pus which blocked its lumen. An examination of this pus showed organisms that were morphologically, culturally and tinctorially the gonococcus of Neisser. This is not the only case we have seen but it seems to emphasize the point in question. Gynecologists as a rule are inclined to treat lightly the question of servical and parametrial infections in the etiology of stricture.

Last but not least do not overlook syphilis in relation to the cause of this condition.

Symptoms and Diagnosis

The symptomatology of this disease is often misleading as signs are not only distinctly local, but at times referred.

The symptoms in the urinary tract are pain, which may be sharply localized at the point of stricture or over the kidney, the latter often being due to back pressure. The subject of back pressure is of great interest and has been well studied by Hinman. Like all other diseases of the upper urinary ways stricture often gives rise to frequency and at times urgency. In addition vesical and even rectal tenesmus may be present.

Hematuria is also a frequent symptom. It is not always present but seem to appear most frequently during severe attacks of pain.

Some patients complain that their pain is dull aching in character and present almost constantly. The other and more common type is the periodic paroxsyms. The referred group of symptoms are usually gastro-intestinal, although Hunner has also noticed numerous cases in which mental conditions were suggested. Chills and fever are common, particularly where there is distinct evidence of urinary infection.

One striking fact appears to be brought out by students of ureteral stricture and that is its symptoms may simulate diseases that are almost too numerous to mention.

The chief fact to bear in mind in regard to symptoms and diagnosis of stricture is that when we obtain symptoms suggesting a lesion of the urinary tract, that part of the anatomy should be thoroughly examined, when stricture will often be found. What kind of an examination should one make in these cases?

1. As in all other diseases a careful history is of the utmost importance.
2. Careful inquiry should be made regarding obscure abdominal conditions.
3. The urine should be carefully examined. In some cases it will be absolutely normal, in another group many will present a hematuria and show many red cells per field.
4. Patients should be cystoscoped and the ureters explored with bulbous catheters or bougies. We regard the wax tipped bougies of value, but not absolutely essential.
5. Carefully made ureterograms we believe give us the last word in diagnosis.

To summarize we believe that a careful history, the pyelo-ureterograms and the therapeutic result of treatment are the main factors in establishing a diagnosis of stricture of the ureter.

The preparation of wax bulbs and technique of urography are not within the scope of this paper.

Pathology

Very little opportunity is afforded in this country for the study of morbid anatomy of stricture of the ureter. It is true that very few persons actually die of this condition and our researches are greatly hampered by the great opposition to the performance of autopsies in this country. Unfortunately at such places as the Wiener Allgemeine Krankenhaus with its 4,000 beds and twenty daily autopsies, this lesion is not taken seriously.

In the limited number of cases we have been privileged to see, the location of the stricture has appeared as an area, showing acute or chronic inflammatory action. These processes vary from a small round cell infiltration, with a small amount of fibrous tissue up to that of complete scarring and dense fibroses. In other words the usual condition is not unlike that of urethral stricture. We can readily apply here the classification of Oberlander of soft and hard infiltrations of several degrees. Stricture may be amular or linear, but usually the former. The area may vary from a narrow band to a diffuse infiltration occupying a centimeter or more of the ureteral lumen. There are cases in which we have an associated diffuse interstitial ureteritis. In the latter cases we will often see on our x-ray plate a shadow which very distinctly suggests a stone. Suffice to say, ureterotomy has been done more than once in cases of this type.

Location

Postnatal stricture may be found at the points of normal narrowing, or at any point along the ureter. Hunner[16] states that stricture is located in the broad ligament

region or within 6 cm. of the bladder in by far the largest number of cases. The next most frequent location according to the same author is at the bifurcation of the internal iliac vessels or about 8 to 10 cm. above the bladder. These are close to the location of lymphatic gland groups. There are other writers who appear to agree with Hunner. It has, however, been our experience that they seem to appear about equally in the various parts of the organ.

Table of location of 60 cases.

At uretero-vesical orifice	3
Lower third of ureter	22
Middle third of	17
Upper third of	18
Total	60

Some writers would hold that stricture only occurs at the normal constrictions, but we certainly cannot concede that. When strictures are bilateral as is frequently the case they are often at approximately the same level.

Stricture of the Ureter and Stone

An interesting point which has caused no little discussion during the past year is that of stricture of the ureter and its relation to stone formation. Does stone cause the stricture or may the stricture not cause the stone. To the former we can state quite positively that a stone descending from the kidney and lodging at some point in the ureter would of course obstruct it, but that does not spell stricture. On the other hand we have been thoroughly convinced not only by the work of Hunner [17] but by our own researches that stricture does produce stone. Wherever we have urinary stasis there is the potential nucleus of a stone. In urethral obstruction, prostatic hypertrophy, vesical diverticula, dissecting trigone, etc., stones are quite common. In addition to the above, it is a noteworthy fact that most of these stones occurring in urinary stasis are of the phosphatic type. In a number of cases of ureteral calculi which in my opinion were due to stricture all of the stones were phosphatic. In several of these cases ureterograms and pyelograms have several times failed to show stones, while at a subsequent date a stone is discovered at or close to the site of the stricture. There is lots of room for research in this particular problem. One cannot help but be impressed by the frequency in which we see bilateral ureteral stricture and the large incidence of associated bilateral stones of phosphatic origin. It is also of interest to note that most ureteral stones are found around the so-called common sites of stricture. It is said that in these cases a little experience with the wax tip bougies will always bring out stricture. We cannot vouch for this statement however. It is reasonable to suppose that urinary calculi occur after acute infections similar to the formation of biliary calculi as noted by Rosenow and Neisser [18], but it does not seem to us to be so common. The ability of the kidney to throw off hematogenous infectious material is astounding, as is readily noted in such diseases as typhoid. In this connection let me call your attention to the fact that in these days of careful investigation it is unthinkable to operate for renal stone without a thorough exploration of both ureters for stricture. We believe that this procedure by establishing good drainage will save many kidneys and repeated nephrotomies.

Reno—Renal Reflex

We have heard much of this phrenomena lately. It is our belief however that it is based on a very flimsy foundation. During the past few years we have examined quite a number of cases in which this so-called reflex was said to exist and in the vast majority found very definite evidence of stricture of the ureter; in several others well marked extra-urinary pathology.

Prognosis

The prognosis in ureteral stricture can in general be stated as good. It however depends to a great extent on the etiological factors involved. Where syphilis is the underlying disease, the prognosis should be good with appropriate treatment. In tubercular lesions the outcome will depend on treatment; local applications or dilations are of no value, nephrectomy or nephro-ureterectomy is required.

Treatment

Like all other conditions, in ureteral stricture we must first endeavor to find the cause and when found remove it. Following the above the mass of material which has been summed up in regard to the treatment of this disease, may be expressed in a very few words. Dilatation through the cystoscope introduced into the bladder via urethra. In the female the use of the Kelly type endoscope and the use of stiff bougies makes the treatment a comparatively simple matter. In the male it is not quite so easy. We believe however that the perfection of cystoscopes of the McCarthy type will also simplify the treatment in men. As strictures are of large and small calibre, it is often necessary to use a very small catheter. In those of unusually small calibre which are practically impassable one should not hesitate to resort to the use of filiform bougies in exactly the same way as we use them in the urethra. Most urologists seem to be impressed with the fact that a number five Charriere is the smallest sized instrument to be used in a ureter, rarely one sees a size four used. We usually see the interval between dilations given as ten days to two weeks. It is my custom to dilate as a rule once a week and do not believe the interval too short.

In the use of ureteral dilators one should be careful not to dilate both sides (where bilateral stricture exists) at one sitting. Where this is done the trauma may produce contractions that will seriously delay treatment to say the least.

Care must also be exercised that one does not puncture the ureter. We have come to the conclusion after seeing many people catheterize the ureters, at times with great force that it is hard to puncture a ureter. However, on the other hand, punctures have occurred in the hands of the most expert. The use of wax bulbs at times often produce serious injury to the ureter. The degree of dilation necessary will depend entirely on the individual case. Dilate until one gets good drainage which seems to be reasonably permanent. Operative treatment of stricture is unsatisfactory and like all other ureteral surgery, should only be resorted to as a final expedient.

Conclusions

1. Stricture of the ureter is a definite pathological entity.
2. It occurs mostly between 20 and 40 years.
3. It constitutes about 10% of the upper urinary lesions.
4. It is not purely a focal infection, but due to extension of disease by continuity as well.
5. It is more commonly a gonorrheal process than is generally supposed and its pathology is somewhat similar to urethral lesions.
6. Symptoms are largely local.
7. Diagnosis may be made certain chiefly by history and x-ray, aided by ureteral bougie.
8. Treatment limited to dilatation.

(Concluded on page 164)

Inguinal, Femoral, Tubal, Ovarian and Tubo-Ovarian Herniae

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The statements, comments, opinions and conclusions herein expressed are based exclusively upon my clinical experience and the careful analytical study of the tubal, ovarian and tubo-ovarian herniae reported in the English, French and German medical literature from 1911 to 1925 inclusive.* To these, I have added ten personal unpublished cases.

In all, seventy-eight herniae were considered. This contribution is based entirely upon findings confirmed by or disclosed in the forementioned cases. All were external in nature. Their outermost overlying saccular covering was skin and all, after reaching a certain stage of development, gave rise to a more or less visible or palpable external swelling. In each case, the diagnosis was fully verified at the time of operative relief. In 1912, I published an exhaustive review of the subject (54) which the present article supplements. To avoid misstatements, insure soundness of comments and accuracy of conclusions, only original clinical reports were consulted.

Brindeau's (39) patient, a thirty-five year old virile man, had normal genitalia, was the father of two children and outside of an irreducible scrotal hernia dating from childhood did not present any other congenital or acquired anomaly. At operation, the hernial sac was seen to contain the right Fallopian tube and a slightly asymmetrical uterus of normal adult size. Traction on the uterus drew out the left tube and two testicles; one testicle seemed normal, the other was very small. So as not to impair the nutrition of the larger testicle, Brindeau utilized the uterus to plug the inguinal canal. Recovery was uneventful.

Case 38 refers to a patient who, outside of an inguinal hernia, had the external conformation of a normal male. He had been married to a normal woman for six years and no pregnancies had resulted. At operation, a uterus, two broad ligaments and two Falopian tubes were found in the hernial sac. External tubal, ovarian and tubo-ovarian herniae occurring in males will receive no further mention in this article.

Cases like the following have likewise been omitted: Rouffard (32), in a forty-six year old III-para suffering from gonorrheal parametritis, incised the posterior vaginal culdesac and evacuated pus. About a month later, there appeared in the line of incision a semi-fluctuating, wine-colored, pigeon-egg sized swelling. The uterus, the tubes, some vaginal tissue and this swelling were removed. Patient made a good recovery. Examination of the removed tissue proved the vaginal swelling to be a part of the ovary that had prolapsed through the colpotomy incision. Herniae not external in type are outside of the scope of this paper. In the female, the frequency of external herniae has been and still is underestimated.

General Considerations

In sixty-nine cases, the patients presented no other anatomical anomaly or deformity, congenital or acquired. Case 6, a seven-week old child, had, in addition to a labial tubo-ovarian hernia, a partial cleft palate. Congenital malformations and mal-development of the uterus, ovaries and tubes not uncommonly coexist with the herniae under consideration. Congenital malformations and absence of the external and internal genitalia were observed: Absence of the ovary corresponding to the herniated tube (13), complete absence of the opposite tube, ovary and broad ligament (30). In case 37, a left-sided hernia, the sac contained an infantile uterus, a left Fallopian tube of normal length but of thread-like thickness and a right underdeveloped Fallopian tube. The right ovary was absent. The vagina was rudimentary, an open blind pouch from one to five centimeters in depth (12, 37, 42); the uterus was undersized (3, 15, 49), bicornuate (56), absent (42). Total absence of the mammae was noted in a seventy-two year old patient (12). In several cases (37) the reporters noted either total absence or under-or mal-development of one or both round ligaments.

Age

Herniae of the uterine appendages are most frequent in infancy; many are present at birth and no age is immune. We report the age of the patients at the time of operation and not that at which the herniae were first noticed or diagnosed. The two youngest of these seventy-eight patients were twenty-two days (45) and seven weeks old respectively. The oldest two were seventy-two (12) and seventy-six (36) years old. Thirty-four of the remaining cases were operated during the first year of life, seven during the second year.

Race

No race is exempt. Case 43 refers to a six-month old colored child; case 30, to a forty-five year old colored nulliparous married woman in whom menstruation had always been vicarious, the flow proceeding from her nose regularly every twenty-eight days. All the other patients were white.

Relation to Pregnancy

Twenty-seven patients were over twenty-one years of age. In four cases, the civil state is not definitely stated. Eight were unmarried. Of the married, there were six nulli-para, three primi-para, two II-parae, three III-parae one VIII-parae (15) and one IX-parae (14). Devane (58) operated a right-sided strangulated femoral hernia present in a five-month pregnant woman. The sac contained turbid serum and the intensely congested fimbriated end of the tube. The tube was removed, pregnancy continued and delivery was normal.

Classification

The classification of herniae into congenital or acquired is misleading, lacks precision, and is, at times, inaccurate. Anatomical conditions predisposing to hernia-formation, such as an unobliterated or an incompletely obliterated canal of Nuck, preformed peritoneal diverticula, arrested or retarded development of the abdominal parietes, etc., may be present at birth and, yet, a hernia be non-existent. If a hernia exists at birth or appears shortly thereafter and presents, at time of detection, hernial rings, a hernial sac, hernial sac-contents and hernial sac-coverings, it is a congenital hernia. Nineteen cases fulfilled these requirements.

* All the publications obtainable at the John Crerar Library, Chicago, Ill.

When it was not definitely stated that hernial contents were present at birth, or that they appeared shortly thereafter (29), the hernia was classified as acquired. Cases 4, 10, 22 in which the hernia appeared after vomiting are considered as acquired because all the essential elements of a hernia were not present at birth. There were forty-one acquired herniae. In three cases, the authors do not state or were unable to determine whether the hernia at hand was of the congenital or acquired type. Many cases are reported with insufficient data.

All the cases herein analyzed were either of the inguinal or femoral variety. There were three bilateral herniae, one ovarian (27) and two tubo-ovarian (35, 42). Bilaterality dates from birth or is of later development. Bilateral herniae are of equal or unequal volume, have similar or dissimilar contents and present like or unlike clinical manifestations. Both herniae appear either simultaneously or an interval of days, weeks, months or years elapses between the appearance of the first hernia and that of the second. Cases have been reported where the herniated ovary and tube of one side have been removed and later a hernia of the opposite adnexa occurred (14). A three-month old patient (35), operated for acute strangulation of a left inguinal tubo-ovarian hernia, presented five weeks later a right-sided tubo-ovarian hernia, the contents of which were returned to the abdominal cavity; an operation for radical cure was performed. In two cases of bilateral inguinal hernia (21 and 31), the left-sided herniae contained each a tube and an ovary. In the former, the herniated tube and ovary were returned to the abdominal cavity; in the latter, they were removed. The undetermined contents of both right-sided herniae were reduced non-operatively.

There were fifty-nine unilateral inguinal herniae. Twenty-six occurred on the right side and twenty-eight on the left. In five cases, the side involved is not stated. Some of these inguinal herniae were complete, some incomuplete, some direct, some indirect. "Lump, the size of an acorn, was situated in the crease of the right groin above and internal to the pubic spine" (6). "On digital examination, the lump occupying the inguinal canal about midway between the deep abdominal ring and the symphysis pubis was clearly definable as a firm, tender, immovable body" (20). "Deep epigastric artery was seen to the mesial side of the sac" (29). Direct hernia is rare in the female.

Of twelve femoral herniae (5, 7, 9, 16, 19, 23, 25, 26, 33, 40, 54, 58), five on the right side, seven on the left, nine were strangulated and three were irreducible (16, 26, 40). Case 23 was a recurrent hernia unsuccessfully operated upon one year previously. Nine of these femoral herniae occurred in individuals thirty-five years of age or over. In case 9, the patient was twenty-eight years old. In the other two cases, the age is not recorded. "Femoral hernia is essentially a hernia of adult life." In four cases, the authors record neither the anatomical type of the hernia nor the side involved.

Herniae are often designated according to abnormal anatomical characteristics existing in the hernial ring, hernial sac or hernial sac-contents. When the hernial sac-contents cannot be manipulated back into the cavity from which they have escaped, the hernia is said to be irreducible. In reducible herniae, reduction, temporary or permanent, spontaneous or manual, can always be effected without a cutting operation but with less (37) or greater difficulty by the patient himself or by his medical attendant; general anesthesia may be necessary. Many reducible herniae disappear spontaneously when the patient assumes the recumbent posture (27), some reappear after standing (24), others recur upon slight (34) or greater muscular exertion. In eight cases, the hernial sac-contents could be returned entirely by taxis to the ebdominal cavity (24, 37, two personal cases, etc.). Many reducible herniae, in time, become irreducible (26, 28, 50).

Irreducibility, partial (2, 4, 13, 57) or complete, predisposes to complications, such as inflammation, incarceration, torsion and strangulation. Many irreducible herniae, in time, become strangulated. The herniated organ or organs may be movable in all directions and yet be irreducible. The terms reducibility, irreducibility, inflammation, incarceration, torsion and strangulation refer to the hernial contents and not to the hernial sac. There were twenty-nine irreducible herniae.

Irreducibility is due to various factors, one or more of which obtain in the individual case: (a) Relative narrowness of hernial canals and rings (inguinal or femoral); (b) Increase, gradual or sudden, in volume of the hernia, the result either of muscular exertion or of pathological changes involving the hernial sac, the hernial sac-contents or both: traumatic, inflammatory (40), degenerative, neoplastic (14) in nature, overgrowth of fat in omentum, etc. (c) Adhesions between the sac and contents (7) or between the contents converting them into a mass too large to be manipulated back into the abdominal cavity. An ill-fitting truss, the constant drag of the hernial sac-contents can cause a contraction of the neck of the sac and inflammation of the sac and sac-contents, and thus induce irreducibility. (d) A sliding hernia (hernie par glissement) (2, 4, 13, 15, 24, 59). In sliding herniae, the peritoneal covering of the herniated viscus or of one of the herniated viscera enters in part into the formation of the sac. That viscus bears the same relation to the hernial sac that it bore to the general peritoneal cavity previous to its herniation; part of the contents or the sole content of a sliding hernia is a viscus not entirely surrounded by peritoneum and therefore not freely movable but partially fixed. "Lateral and posterior walls of the sac are derived from the two spreading layers of the broad ligament" (2). In case 50, a suppurating inguinal ovarian hernia, the operator was unable to find any trace of peritoneal covering or sac. The overlying skin was thickened and edematous; a quantity of organized lymph and odorless pus were present.

An irreducible hernia is strangulated when the blood supply of the hernial contents is disturbed to such an extent that gangrene or necrosis of the prolapsed tissues or organs will result, unless the offending constriction be relieved. Strangulation is an epiphenomenon of irreducibility. Strangulation, be it of sudden (10, 52) or gradual (23) onset, always imperils the patient's life. All irreducible and all sliding herniae are predisposed to strangulation. In our series, we found twenty-six strangulated herniae; nine femoral and seventeen inguinal. In bilateral or multiple herniae, one, two, or more of the herniae may be strangulated simultaneously or successively. The seat of constriction may be the neck of the sac (25), the external inguinal ring (6), etc. Strangulation not infrequently results from adhesions constricting or binding the sac-contents to the hernial sac (49). Interference with the venous and arterial circulation results in congestion, stasis, serous exudation, gangrene and other inflmmatory phenomena. The amount of serous exudate depends upon both the degree and duration of the strangulation and the extent of the secreting surface of the sac and contents.

(To be concluded in August issue)

Mirror Writing and Left Handedness

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Introduction

When the immortal Alice stepped through the mirror above the mantelpiece and found herself in that strange looking-glass world, the first book she picked up seemed to be written in an unknown language. It ran as follows:

YKCOWREBBAJ

sevot yhtils eht dna, gillirb sawT'
;ebaw eht ni elbmig dna eryg diD
,sevorgorob eht erew ysmim llA
.ebargtuo shtar emom eht dnA

Alice was puzzled, but a sudden inspiration made her hold the printed page up to the glass and, lo and behold, the words ran the right way:

JABBERWOCKY

'Twas brillig and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogroves,
And the mome raths outgrabe.

Any mother whose child began to write in the manner that puzzled Alice might well be worried and alarmed. Yet such things happen, and particularly with left-handed children. A boy set to copy a word will hand back this result, "eppla", instead of "apple"; another will continually write figures backward, copying "867" as "786"; while still another persists in reciting "13" as "31", "51" as "15" and so on.

Not only pupils do queer things. Some years ago a teacher in a small school in Bermuda whose right arm had been broken, returned to her class and proceeded to write questions on the board with her left hand. The result was unintelligible to the children. She had begun at the right side of the board and written backwards toward the left without perceiving the difference.

What happened to the teacher who wrote backward and to the children who reversed their numbers and their spelling? These deviations from what we consider the normal are neither evidences of poor vision nor signs of deficient mentality. They mean a reversion to the use of the cells of the right half of the brain which, as a rule, we do not make use of in reading and writing.

The centers governing the functions of reading, writing and speech are normally located in the left side or half of the brain, and this left hemisphere is ordinarily much more actively employed than the right. The reason for this unequal activity of the two halves of the brain lies in the physiological fact that the nerve fibres from the left half cross to the other side of the body at the base of the brain to be distributed to the right leg and arm, while the nerve fibres from the centers in the right half of the brain cross in a similar fashion to govern the entire left side of the body. Naturally that half of the brain which serves the most active side of the body comes to be most highly developed, and as most of us are right handed and right sided as well, the functions of the left half of the brain predominate.

Predominant Right-sidedness

To obtain a comprehensive view of the how and why of mirror writing, the subject is best approached from a left-sided point of view. "Put your best foot foremost" admonishes the proverb; but how many of us know which is our best foot, or even that we have a best one and another one that is not so good? Men discover that their right foot is larger than the left because the shoe man tells them to allow for this discrepancy. Women learn from the glove-fitter that the same difference holds good for the hands. But this is a question of size only. The right foot is larger because it supports the slightly heavier weight of the right side of the body; and the right hand is larger because of the greater muscular development due to its preferential use over the left.

Suppose the proverb ran, Put your best hand foremost. Hardly anyone would hesitate in deciding that his right hand was a better asset than his left. At least, only 4 per cent of us would come to the opposite conclusion, and that would be because 4 per cent of us are left handed. But how many know that the 96 per cent of us who are not left-handed are not only right-handed but right-footed, right-armed and right-legged as well as right-eyed? Moreover, the skin is more sensitive on the right side of our bodies, and our hair grows slightly faster or thicker on the right side up until the age of forty-five when the reverse becomes true. The senses of touch, taste and smell are more acute on the right as well as sensitiveness to slight changes in heat and cold. And, apart from any actual deafness, most people are aware of the fact that it is easier to perceive faint noises or sounds from one side rather than the other.

In persons practised in the use of both hands it is sometimes difficult to determine by the use of the dynomometer, an instrument which measures the strength of the grip, whether they are naturally right or left handed. Their handedness may then be proved by the use of the manuscope which shows whether they are right or left eyed. So true is it that a right handed individual is invariably right eyed and vice versa that this instrument which detects whether a person excels with his left or right eye for sighting an object, settles the matter of handedness.

That a right-handed person is right-footed as well is quickly discovered by anyone who attempts with his feet movements that require dexterity or training; clog dancing or reversing in ordinary dancing, for instance. It is decidedly more difficult and requires much more practice to shake a skillful left foot or to turn your partner gracefully to the left.

Most of us are firmly persuaded that our looks, be they good or just nothing to write home about, are at least the same on both sides. Nothing of the kind! In taking a profile picture the photographer knows better; he prefers the left side, for he knows that the lines there are less firmly set than on the right side. Consequently a photograph taken from the left is more apt to accord with the lady's given age and one from the right side more likely to accord with her calendar age. So we are right faced, too. Our symmetry is like that of the leaves of the trees, no two of which are ever found to be exactly alike, however much they may resemble each other from a distance. In short, a right handed person is right-sided in all his muscles, senses and functions, and correspondingly left-brained.

But it is an open question why a man buttons his coat to one side while a woman buttons hers to the opposite side; and why neither of you can tell which way without looking. Perhaps it would be just as easy to explain why a Japanese folds his kimono from left to right when

he is alive, while the one he gets when dead is always made to fold from right to left.

Causes of Left-handedness

Scientists, and others not so scientific, have long been puzzled by the universal predominance of right-sidedness and more particularly of right-handedness. Many and varied have been the explanations propounded, none of which has received exculsive or even general acceptance. And it is just as difficult to explain why one in twenty-five should be left handed. That old warhorse, heredity, has been dragged into the fray, and yet instances of prolonged hereditary descent of left-handedness are extremely rare, whereas they ought to be fairly constant if left-handedness were an inherited characteristic.

A theory long in vogue considered habit or training to be the determinative influence, the majority of infants being surrounded by people who are right handed and who offer them objects with the right hand toward the right hand. The proponents of this idea, however, neglect to offer us any explanation as to how these right handed people all got that way in those prehistoric days when man like his forbears used either hand at will. To test this theory children have been scientifically brought up in a way which prevented any suggestive bias. They were offered articles equally as often with the left hand as with the right, and in every way subjected to similar influences on the two sides. Invariably they have been found to develop a distinct preference for the use of the right hand as early as the sixth or seventh month and in the usual ratio of 25 to 1.

Conversely, children who later prove to be naturally left-handed, persist obstinately in their preference for the left hand not only in spite of their parents being right handed, but also in spite of their determined efforts to enforce right-handedness on their unfortunate offspring—unfortunate, not because they are left handed, but because reversal of handedness often results in serious upset to the child, and because of the ridiculous but general prejudice against the use of the left hand.

So put to it have the scientists been to invent a plausible theory for right-handedness that they have advanced the position of the nursing infant as a possible factor. They would have us believe that a child nursing on the right side of a right handed mother has its left arm compressed against the mother's body, and as the right remains free he comes to use it more freely. In reply to this it is enough to cite the legion of bottle-fed babies, to say nothing of the fact that babies are not nursed exclusively on one side.

Another of the many theories proposed is based on the fact that the center of gravity of the human body lies a little to the right of the mesial line. If a body were split in the mid-line into two halves of exactly the same size, the right half would weigh slightly more than the left because of the distribution of the internal organs. Consequently a somewhat greater weight is thrown on the right leg and foot. So it is claimed that a firmer support is thus provided for the movements of the right arm and hand than is furnished by the left foot to its side of the body. But this idea may be easily confuted. Infants become right-handed before they have thrown any weight on either foot and long before they have learned that, like the tower of Pisa, their body is slightly out of plumb. Again, in left-handed persons we do not find the internal organs so transposed as to throw the balance to the left foot, which would be a necessary corallary to the theory were it tenable. Furthermore, the anthropoid apes whose internal organs and center of gravity are disposed to the right as in man, do not show the tendency to right-handedness common in their evolutionary culmination.

Primitive Ambidexterity

It seems beyond doubt that primitive man with the quadrumana, apes and monkeys, was ambidextrous or rather, non-dextrous. The earliest implements fashioned for use by primitive man, which have been dug up in excavations made for the purpose of ethnological study, are found to be adapted in about equal numbers for either hand. Likewise, dogs and other animals, in learnto do tricks, become right or left sided, one as easily as the other, at the will of the trainer. They show none of that universal human obstinancy in regard to handedness.

In those far-off days when either hand served its master, attempts to set down marks as a means of communication were probably made at first indifferently either with the left or right hand. Not only was it a matter of indifference which hand was employed, but the direction of the writing might be either from left to right or from right to left. Interesting testimony to this early lack of preference is still extant in a form of writing known as "boustrophedon", often seen in early Greek and Latin inscriptions. It is characterized by the lines being written alternately from left to right and from right to left. Many languages in use at the present time are written, as was Etruscan in older days, from right to left; as, for instance, Arabic, Aremaic, Syriac and Hebrew. Japanese newspapers and books begin at the end, or what would be the end for us. Their footnotes are printed at the top of the page, and the punctuation marks are inserted at the beginning of the sentence. They begin writing at the top right-hand corner of the page, and write in columns from top to bottom as to words, and from right to left as to the columns.

That the original lack of bias in the use of the hands was gradually upset by the conditions of primitive hunting and early warfare is perhaps the most plausible theory that has heretofore been suggested in explanation of modern right-handedness. The left hand is thus supposed to have assumed a passive function because of its constant employment for defense in holding the shield over the most vulnerable organ, the heart, while the right became habituated to the more active and aggressive role of offense with spear and club.

Role of Ductless Glands

But no theory has as yet proved adequate to satisfactorily explain the inherent fixity of handedness. To attribute it to instinct is dodging the question. The word instinct is used when lack of knowledge prevents being more exact. It is, however, very probable that many of the so-called instincts are actually derived from the action of the invisible secretions of the mysterious and fascinating internal glands of the body. It sounds like a fairy tale, but science has shown that we owe the determination of our sex, size, and color and even our character and personality to the hormones, as these secretions are termed. If so, why not our handedness as well?

Certain of these glands exercise a dominating control of the functions of the body up until about the age of forty-five. At that period their influence wanes and another one of the glands assumes the leadership. It is known that the former act more strongly on the organs of the right side of the body while the later is more potent in influencing those of the left side. It seems reasonable to suppose that the glands which act more forcibly upon the right side of the body may have acquired, in the course of evolutionary ages, as one of

their many functions, the control and determination of handedness. If so, they would naturally incline to making the right hand predominate. It is suggestive to note in corroboration of this hypothesis that we are less decidedly right-handed after middle age; that is, we can learn to do things with the left hand more easily as compared with the right after the age of forty-five than before that time. And this is just the period when the right-side dominating glands are on the decline, and when their function of control is being taken up by the left-side dominating pituitary gland.

Mirror Writing

As previously intimated, mirror writing is a form of chirography in which the words are spelled and written from right to left just contrariwise to our ordinary manner. It is what you see in the impress left on a blotter, and derives its name from the fact that, if held to a mirror, the reflection will appear as ordinary writing. Children often use it as a semi-secret code in the surreptitious correspondence of school days while suffering from the growing-pains of puppy-love. How it may be used by children of a larger growth is thus described in a recent dispatch from Tangier:

"Tangier is a hot-bed of intrigue; everyone is either a spy, paid or voluntary, of some Government or interest concerned in Moroccan affairs, or is being spied upon. This gives a certain comic-opera air to the place. For instance, you are placidly sipping a vermouth when an ill-dressed, shifty-eyed man slides in through the door, slips into a chair at a nearby table, calls for beer and a writing portfolio, peers stealthily about the room to see that he is not observed (thereby drawing the eyes of everyone present) and hastily scribbles a letter. He blots the letter carefully, seals it and performs a William Gillette exit. He has hardly gone when a pale, gangling, nervous youth strolls in, trying to appear casual. He seats himself at the table his accomplice has just vacated, tears the blotting paper from the portfolio and hurries off to read the message in the mirror."

Mirror writing was long regarded as a sort of trick or sleight-of-hand performance. Neither of these assumptions is correct, for most persons who can write in the natural manner with their right hand are able to master this apparently abnormal method with their left hand in much less time than would be necessary for learning it as an acquired feat. This facility is believed to be due to the fact that it is simply calling into play a latent or suppressed function which is developed in the right side of the brain at the time when our left brain learned to produce ordinary writing. In fact, there are reasons for supposing that mirror writing is as natural a method of writing for the left hand as is ordinary writing for the right hand.

Dual Writing Centers

Dr. J. F. Allen, an accomplished ambidexter, who also became a fluent mirror writer, records that on learning to write the letters of a new alphabet in an unaccustomed language with his right hand, he found that he could immediately write the same in mirror fashion with his left hand without any separate practice. And Dr. T. J. Carpenter, Jr., records a case of an expert stenographer who was forced by a gunshot wound to make use of his left hand for writing. With considerable difficulty he trained it to the ordinary style of writing, but found that, unless he preserved steadily concentrated mental attention, the left hand invariably tapered off into mirror writing. The explanation in each case would seem to be that the left hand, when it produces mirror writing, uses muscle movements that are easy and natural to it for the reason that brain centers for mirror writing are unconsciously formed symmetrically with those for the right hand when the latter learns ordinary writing. Because of our one-sided system of education, the mirror writing centers in the right brain are suppressed instead of being allowed full play, but they remain potentially available in a latent state.

This duality of centers exists not only for writing, but for all muscular movements of the two sides of the body. That one is only partially suppressed and often tries to work simultaneously with its fellow is often seen in children when they are learning some skilled movement with the right hand. Try as they will, they cannot at first prevent the left hand from following and attempting in a half-hearted way to reproduce the movements of the right. Adults, as well, often unconsciously lighten their manual tasks by employing both sides of the body, and it is not unusual to see the left side follow in a subsidiary way any difficult movement of the muscles of the right side. A one sided burden, like a pail of water, is made easier by a balancing object in the other hand in spite of the additional weight. And if the left arm be tied to the side or merely kept in the pocket, movements of the right arm are distinctly interfered with and made decidedly more difficult.

A striking illustration of the dual action of the brain is recorded in a case of multiple personality reported by Dr. Bruce. The patient underwent in succession three distinct and separate phases of existence, each with an entire change of character and handedness. In one he spoke and understood only Welsh, was restless, excitable and mischievous, entirely left handed and wrote in mirror fashion. In another he spoke and understood only the English tongue, was quiet and melancholy, strictly right handed and wrote in ordinary style. The third phase showed a blending of the characteristics of the two previous states, especially noteworthy being the fact that he was at this time ambidextrous, and wrote both mirror and ordinary writing. The complete change in handedness, not only for writing but for all other muscle movements, was undoubtedly due to the alternating dominance of centers in the right and left hemispheres of the brain.

Normal Mirror Writing

In addition to the influence of these brain cells that have learned to activate mirror writing in the left hand at the same time that their symmetrical duplicates in the opposite hemisphere learned to control ordinary writing in the right hand, there is another interesting cause contributing to the ease and naturalness of mirror writing for the left hand. Briefly, it is the fact that centrifugal movements are easier than centripetal ones and more graceful as well. Which means, what we all know in other words, that pushing movements are easier than pulling movements.

For example, pushing a baby carriage or a wheelbarrow is less difficult than pulling either one. It takes more effort to pull a heavy weight toward you than to push it away. Whittling, turning a screw-driver and winding a watch are movements ordinarily made in a centrifugal direction. A speaker usually gestures toward the right with his right hand and toward the left with his left hand, that is, centrifugally; rarely the reverse, and not often with both hands to right or to left. Similarly, in playing scales on the piano, it is easiest when both hands are moving in opposite directions away from the center; that is,—both symmetrically and centrifugally. There is more difficulty when both hands approach each other moving toward the center of the piano; that is—symmetrically, but centripetally; and it

is still more difficult when both hands move in the same direction to left or right at the same time, that is—not symmetrically, and one hand moving centripetally while the other moves centrifugally.

You can learn mirror-writing by taking a pencil in each hand, starting from the middle of a sheet of paper and writing simultaneously toward the left with the left hand and toward the right with the right hand. The two hands will each be moving symmetrically and centrifugally. If the left hand is compelled to make motions symmetrically similar to those of the right hand, it will produce mirror writing. If the sheet is translucent, this can be read as ordinary writing from the back, otherwise by reflection in a mirror. A little practice will then enable almost anyone to write with the left hand in mirror style alone and without the aid of the right hand as a guide.

Pathological Mirror Writing

A notable example of mirror writing is preserved in the Ambrose Library at Milan. It is the Codex Atlanticus of that celebrated genius, Leonardo da Vinci. The Codex was compiled during the declining years of Da Vinci at a time when his right arm was paralyzed. So it is plausible to assume that he employed mirror writing as the easiest and most natural method of writing when the left hand was forced to replace the right. In fact, so often has the habit of mirror writing been found associated with conditions of apoplexy and paralysis that it was at first erroneously looked upon as itself a symptom of disease. Later it was realized that mirror writing was instinctively adopted in cases where the right hand or the left brain was disabled because it employs the movements most natural to the remaining sound side of body and brain.

It is now easy to understand what happened when the disabled Bermuda school teacher began to write in mirror fashion, and what happens when children see and write their words and numbers backward. The teacher wrote backward because she unthinkingly allowed the left hand to do what was most natural to it. The children see backward because they have not yet learned to suppress the unnecessary half of that double image which the two halves of the brain always receive when we look at things; they are still mirror readers.

Ambi-Vision

It is because each eye sees an object from a different point of view and thus causes the brain to register two sets of images that our vision gains its perspective and stereoscopic effect of depth and distance. In childhood we learn automatically to fuse the two views into a perfectly blended composite one, by suppressing the details of one of the images in all but what it contributes of depth and distance. The native African, like young infants and primitive blacks the world over, cannot see a picture on a flat surface.

Martin Johnson recounts in his camera-hunting tales that the most intelligent natives would turn a picture upside down in a hopeless attempt to make out what it represented. Finally one boy was trained as a laboratory assistant. At first the photographs meant absolutely nothing to him; he could not distinguish an elephant from a rhino. It was a matter of months before he could adjust his vision to the flat surface so that outline and shading would convey an impression of three dimensional objects to his brain. Now he is a picture fiend.

A missionary in the Solomon Islands started a new class of raw savages on their a, b, c's with a book of hand charts. From the first they insisted on holding the charts upside down. He got tired of correcting them and decided it would make no difference until they were further along. In time they learned their letters and learned to read, but always holding the books upside down. Afterwards he could not break them of this habit, and the entire class came to church and sang with their hymn books and read from their Bibles upside down. They could not read with the pages right side up; they had become mirror readers.

Here was an example of a primitive people not so strongly predisposed to the use of the right hand as races in a more advanced stage of development, and furthermore not so strongly predisposed to the use of the left brain for writing and reading. Consequently they chose to reverse matters, and suppressed the images that we are accustomed to preserve. They learned to read with the images that we are accustomed to suppress and thus became mirror readers. They were in a stage of racial development analogous to that of the young child who is able spontaneously to see or write in mirror fashion. For the child has not yet learned to suppress the activity of the images and centers in his right brain; he has still to acquire the modern racial habit of using only those of the left brain for reading and writing.

Practical Applications

Two practical applications have been derived from a study of the relations between left-handedness and mirror writing. First, that it is dangerous to force right-handedness on naturally left-handed children; and second, that the cultivation of ambidexterity is of value to the individual. While some authorities hold that a child when very young and before he has learned to write, may be changed from left-handedness to right-handedness without serious results, it is generally agreed that any attempt to enforce right-handedness after the child has entered school is fraught with danger. By this time brain and muscle functions have been co-ordinated and co-operate automatically. To break in upon cerebral processes that have become shaped and fixed is a serious matter and not to be sanctioned except for some unusual reason, certainly not to suit the whim or prejudice of some teacher. The number of cases of stammering and stuttering which have occurred in left-handed children after attempts to enforce right-handedness, and the number of cures of stuttering which have resulted in such cases when the unwarranted interference has been stopped and the child encouraged to use the left hand freely for all finely adjusted movements, is too great to be ignored. And stuttering is just one of the injurious nervous effects that may be induced by a forced change from natural left-handedness to artificial right-handedness.

A naturally left-handed child should not be permitted to train or develop his left hand exclusively. He should rather be encouraged to use both hands and to cultivate the advantages of ambidexterity under a teacher who harbors no prejudices on this subject. In fact, the teaching of ambidexterity has long been advised as a valuable means of promoting the development and symmetry of both body and mind. It is difficult to realize to what an extent your left hand is awkward and inefficient. Try for a single day to duplicate with it all the ordinary movements so easily made by the right hand in your accustomed routine. An experiment of this sort will quickly show what an advantage bimanual dexterity would be to the ball-player, the carpenter or the surgeon.

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The Physician's Library

Genius: Some Revaluations. By Arthur C. Jacobson. 160 pages. An Adelphi Publication: Greenberg, New York. $2.50.

A book representing elaborate critical study of the subject and presenting deductions which must be given serious consideration by students of literature and art. Curiously enough, the profession of letters appears to be about the only one in which critics avoid study of fundamentals. They take up the mystic metaphysics of a Freud who commits a crime in the eyes of science by discarding material which does not fit into his theories. Literary folk rather dislike going back to the science of Virchow who showed that mental states have their physical basis—a matter of behavior of organic cells in response to normal or abnormal stimuli. Possibly a classical training in literature does not teach any method for getting at basic facts like those of the engineer, for example, whose education is laid in the bedrock of his profession.

For a long time there has been a growing belief that geniuses in literature and in art have something the matter with them. What is and what has been the matter with them? Some authors have collected data bearing upon proofs of insanity, others have set out to show that alcohol or drugs let loose the divine afflatus. A theory to the effect that we are dominated by our endocrine glands has basis in fact. Gould in a notable collection of instances describes the effect of eye strain in the production of abnormal mental output which incidentally includes genius in its range. Microbe toxins of various kinds are known to influence modes of thought and expression of thought in characteristic ways relating to the species of microbe which is causing morbidity. Jacobson paints ethnic hybridity into his picture of genius and describes what we may readily enough accept as the effect of mixing up traits of mental habit belonging to different racial groups in the parentage of certain authors who have influenced mankind profoundly with their writings. Abnormal associative faculty has been presented as an explanation for the occurrence of genius not only in literature and art but throughout the range of human occupation. All of these various factors in genius are doubtless present but we assume that not more than one or two may rule the conducting of expression for any one individual. Jacobson throws the entire batch of explanations for genius into his crucible and secures a concentrate of dual personality, thereby agreeing with a number of psychologists. The crystallizable element of dual personality is then put through its performances in the laboratory of this author's book. The average or mean-type individual represents a complicated machinery of repressions. These are safety devices for allowing the common run of us to play safe, like a square brick in a square hole belonging to our social structure. No one is very likely to deny the value of solid and permanent walls of square brick, but when we come to the matter of decoration of our social structure from string course to gargoyle the genius must be brought forward,—or what is commonly the case, brings himself forward as a feature of design in our human thought architecture.

The primary personality of most of us is the one with its complexes of repression belonging to convention. The secondary or subconscious personality is the one which carries riches for free distribution in the case of the genius who childishly disregards the conventions of life. He is abnormally sensitized by nature and responds to stimuli in an exaggerated way.

According to Jacobson, genius germinates in defective elements of humankind and not in the eugenically fit. Genius is not a phase of degeneracy though derived from it. An old theory which considered genius to be identical with degeneracy or insanity is invalid. Theory which accounts for genius on a Freudian basis is inadequate. Any theory which denies derivation of genius from bad stock is uninformed.

Our author elaborates all of these points and brings to bear a collection of data which carry conviction.

Many people who are dissatisfied with their primary personalities liberate their secondary personalities by means of alcohol or other drugs but if this were the only requisite for expression of genius we might all be geniuses at will. Jacobson shows that it is only the one who carries the inherent qualities of genius who appears in that light when alcohol or any other drug releases his emotional personality from the one that is under control by the intellectual set of faculties. He speaks strongly against prohibition which would deprive us of wine and beer, thereby depriving the world of some of the brightest jewels of the mind.

It is only the true genius who appears as such in cases in which microbe toxins accentuate the action of subliminal insight.

People who are not geniuses are merely erratic or nuisances when acting outside of their primary minds in response to the kinds of stimuli which cause real genius to unfold. The successful genius actually remains under guidance by his intellectual faculties (minus many of their repressions) otherwise his work would be a failure. It becomes a failure at such times as the genius may be deeply intoxicated or temporarily insane.

Entomologists of the human psyche may specialize in butterflies and bees like a Stevenson or in blow-flies or tumble-bugs like a Dreiser. The world at large considers this merely as a matter of choice and personal taste on the part of such authors and of their readers. The literary critic armed with Jacobson's book will have a better and more satisfactory explanation for the workings of the mind of genius.

ROBERT T. MORRIS.

The International Medical Annual: A Year Book of Treatment and Practitioner's Index. 560 pages; 158 illustrations, including 81 plates. William Wood and Co., New York, 1927.

This is the forty-fifth consecutive yearly volume of this distinctive publication, and in our opinion this issue eclipses all preceding ones in general interest and solid content. The thirty-three contributors, under the direction of the two able editors, Drs. Coombs and Short, have provided a clinical mine in which the practitioner will find inexhaustible riches. The alphabetic arrangement of the topics, under the heading Dictionary of Practical Medicine, is an ideal one. The general index is exhaustive, running to 25 pages, with the principal articles heavily typed. Upon the whole this volume merits the highest praise as a most judicious selection from the whole of the world's recent medical literature. The volume is handy in size, owing to the type and paper used, despite its vast content. A perusal of this work will constitute a post-graduate education of the highest type.

Examination of Children by Clinical and Laboratory Methods. By Abraham Levinson, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School, etc., 192 pages, including index; 85 illustrations. C. V. Mosby Co., St. Louis, Mo., 1927.

This is the second edition of Levinson's deservedly popular work, the aim of which is to make pediatrics an art as well as a science. Nothing more useful to students and practitioners as well is available. The best methods of examination and their interpretation are thoroughly dealt with. The danger of placing laboratory tests above all clinical signs and symptoms is emphasized, decisions being made on the clinical findings coupled with the laboratory tests. Therefore the general practitioner will find this textbook a most practical one. A point is made of describing simple tests and methods that can be carried out by every practitioner of medicine in the ordinary laboratory or even in the office.

Principles of Chemistry. By Joseph H. Roe, Ph.D., Professor of Chemistry, George Washington University Medical School, etc. 378 pages, 30 illustrations, and an index. C. V. Mosby Co., St. Louis, Mo., 1927.

Professor Roe's book is intended to serve as an introduction to inorganic, organic and physiological chemistry for nurses and students of home economics and applied chemistry. It is written in simple language but is thoroughly scientific. The applications of chemistry to biology, medicine and the arts are especially stressed. Laboratory technic is expounded in a comprehensive set of laboratory experiments of a sort not requiring complicated apparatus. Digestion, metabolism, the vitamins and dietary requirements receive adequate consideration for the purpose of the book. This textbook meets the requirements of a sixty-hour course in chemistry most admirably.

The Care of the Face. By Oscar L. Levin, M.D., Chief of Clinic, Cornell University Medical College, etc. 225 pages, including a glossary. Greenberg, New York, 1927. $2.00.

This book is evidently intended for the laity, and is admirably calculated to enlighten them on the proper care of the skin of the face. Through much of the matter runs a vein of bright humor which makes the book eminently readable and thus gets valuable information over more effectively. How the complexion is influenced by the general health is especially well presented and the sections exposing the methods and remedies of the charlatans and commercial frauds in general are vigorously phrased: indeed, one chapter is especially devoted to the quacks. "Beauty Culture" of the prevailing type, the successor to-day of "Diseases of Men," receives a knockout blow. The field of facial dermatology is adequately covered in so far as a work for lay readers could achieve such an objective. This book should help the intelligent reader to an understanding of the treatment due a face, and to a realization of what fine results proper treatment may accomplish. It may be confidently recommended to our patients, fair and otherwise, as an effective foil to the useless, perilous or injurious bunk which brazen exploiters attempt so assiduously to foist upon them nowadays.

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NEW YORK, JULY, 1927

Doctor Pedersen's Presidential Address

In view of the rapidly growing importance of physiotherapy as the third member of a triad, the first and second elements of which are medicine and surgery, Doctor Pedersen's Presidential address before the American Electrotherapeutic Association—printed in this issue—gives us a timely perspective of the vital relationships of this great branch of practice to the co-ordinate parts of the modern science and art of healing.

Teamwork Between Evolving Brain and Skull

Dr. Frederick Tilney, of Columbia University, has made a thorough study of the brain of prehistoric man. One of his conclusions is that there has been a progressive enlargement of the frontal lobes as man has advanced in intelligence and culture, with, of course, a corresponding enlargement of the skull. It has been possible to reconstruct the brains in question by making casts of the skulls, and it is extraordinary how much Dr. Tilney has been able to examine in the matter of convolutions, fissures, vascularization, etc.

May it not be possible that some of the cerebral disturbances of modern man are due to failure of anatomic and physiologic adaptation between skull and brain in given individuals? May not certain of the insanities, and perhaps epilepsy, be related in some way to such maladaptation growing out of evolutionary shortcomings?

Perhaps the failure of the clinoid processes of the sphenoid bone to diverge widely, thus imprisoning the pituitary gland too closely within the sella turcica, and giving rise to some, at least, of the classical cases of epilepsy, is a phase of the subject under discussion. This is a condition which has been well worked out by the roentgenologists.

Control of Environment is Life

Dr. H. S. Jennings, of Johns Hopkins University, does not take seriously the theory that our campaigns against tuberculosis and other preventable diseases permit the unfit to survive and result in the breeding of an inferior race. In the first place, health workers do not find the great majority of those whom they have preserved to be undesirable or at a disadvantage in a world in which the attacking agent has been controlled. In the second place, if such control of environment were evil many organisms would have disappeared long ago or never have appeared at all. Control of environment is the very fabric of life; organisms cannot live without it; organisms have been practicing it assiduously for a hundred million years and some of them are still flourishing. Who believes for a moment that scientific research, hygiene, medicine and the arts of public health can do other than adapt organisms more and more completely to a controlled environment? The control of environment is life, not degeneration.

A Notable Opinion

The authority of the State of Virginia to sterilize mental defectives has been sustained by the United States Supreme Court.

Justice Holmes made the interesting point that the principle sustaining compulsory vaccination was broad enough to cover the proposition of sterilization.

It will now be possible for Virginia to sterilize and discharge from custody many defectives.

Why, asks Justice Holmes, may the public welfare call upon the best citizens for their lives, and not call upon the worst for a lesser sacrifice?

"It is better for all the world," reads the Court's decision, "if instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind."

This decision should profoundly affect the practice and progress of other States.

Freshman Physique

According to Dr. William R. P. Emerson, half of the young men and women entering college are below par in weight and from a fifth to a third "exhibit practically all the signs of poor physical condition."

Dr. Emerson thinks that the physically handicapped student should be conditioned, and obliged to work off the lien on his or her academic life. All students should be obliged to participate in physical activities calculated to build health and physique, instead of leaving such matters to limited groups who overdo athletics.

All very well, but why should these young folk be "shot to pieces" before entering college? What's the matter with the pre-collegiate life?

Perhaps we should say rather say: What isn't the matter with the pre-collegiate life?

It is a rotten Denmark that cannot induct healthy students into its colleges.

Dance Calories

From the savants of the Physiological Institute of the University of Helsingfors we learn that the waltz calls for 3.99 calories per hour per kilogram of body weight. The scottische uses 4.76 calories, while the fox trot

demands 4.78. The polka needs 7.56 calories per hour. The mazurka seems to cap them all, with a demand of 10.87 calories. Some of the more strenuous innovations from the jungle must have very considerable requirements. It follows that food intake must increase if dancing is added to one's other activities. The exercise involved would be an excellent thing if it were not associated, as it usually is, with loss of sleep and vitiated atmospheres.

The Effect of Music Upon Lactation

Nebert and Koch, the German physiologists, have noted that music has pronounced effects upon the milk yield of certain mammals. They do not have to be subjected to long "concerts," but only to music played during the milking. An invariable increase resulted from the treatment. It is to be presumed that practical application of this observation will follow both in the dairy and nursery. Those who are engaged in the campaign to promote breast feeding will doubtless invoke the aid of the radio and phonograph, now that the galactogenous properties of music have been demonstrated. We are inclined to suspect that jazz will prove more effective than Beethoven.

Biologic Reversion

If we knew a great deal more than we do about our remote ancestors clinical atavism would be an important phase of medicine. For all we know the paranoiac may be simply an individual with a mental make-up which would have been altogether normal in a Neanderthal man. Perhaps all the anomalies, particularly those of the hereditary type, represent persistent survivals of characters which once upon a time constituted valuable endowments, enabling our ancestors to adjust to various environments in different ages. When it is remembered that the paleontologists now believe that the human family has been upon the earth about sixteen million years, it is conceivable that there have been periods when syndactylism, or night blindness, or Huntington's chorea, or Friedreich's ataxia may have been biologic assets and not liabilities. Who knows but that there have been times in the evolutionary history of man when hemophilia possessed distinct advantages—when a deficiency of platelets and of blood coagulability were required by the environment? Absurd? Very well; but will the scoffer now tell us why there should be any hemophiliacs today, and what hemophilia really is?

Miscellany

A Dry Paradise

We note the following in a recent issue of the *New York Times*:

To the people of Orange County, Florida, Dr. Howard A. Kelly has given a 200-acre tract of land, on condition that intoxicants shall never be used there. A permanent caretaker is provided in the deed of gift. Dr. Kelly had himself elected President of the park organization. It may be the one place where the Volstead act is observed.

In the tract there is a wonderful spring of water, which, according to the Orlando *Sentinel*, "has the element of the mysterious in that it issues from a cave which has been entered for about 100 feet, and, best of all, it spreads over a sand bed, without any mud, so that one can come, as it were, into living touch with it by wading." The caretaker would be well advised to recommend the spring as Ponce de Leon's "Fountain of Youth."

Just before the land boom burst, Dr. Kelly was offered $200,000 for the property, but he stuck to his resolution to set it aside as not only a public recreation ground but a sanctuary for game, birds and fish. Orange County will build a paved road from Orlando, eighteen miles away, to the new park. It is the gift of a winter visitor.

Such a place makes us think of the Presbyterian Church in the story. It seems that a gentleman had to spend several hours in a hamlet while making a train connection, and, growing thirsty, decided to look for a drink. He confided his requirements to a quaint native whom he found whittling under a maple tree. The native thereupon gave him very elaborate directions. He was to go so many blocks in a certain direction, and so many in another, and so many in still another, until he reached the only church in town—the Presbyterian, at the corner of Beech Street and Walnut Place. The gentleman protested at this point that he did not want to go to church, but to get a drink. The native admonished him not to excite himself, but to take a good look at the church when he got to it. "Fix its location firmly in your mind," said the native, "and remember this—the Presbyterian Church is th' only place in town where ye *can't* git a drink."

Dr. Kelly's place will serve the same purpose for the nation as the Presbyterian Church did in the hamlet of our story.

Medical Progress *à la* Shuman

One of the most thorough and readable reviews of medical progress during 1926 appeared in the *Medical Times* of January of this year. Interesting because of its clear perspective and philosophic outlook, and because it was written by one of the most capable men today in internal medicine—John William Shuman, M. D., F. A. C. P., of Los Angeles. The Missouri Valley Medical Society was a heavy loser when Dr. Shuman went to Syria to take the chair of medicine in a college there. Los Angeles was the gainer when the world traveler surrendered his post and returned to the land of his birth. The old Missouri Valley Society has had in its membership some of America's most brilliant lights, and whether death or removal has separated them, they still live; Shuman is one of them.—*Medical Herald*, May, 1927.

Stricture of the Ureter

(Concluded from page 154)

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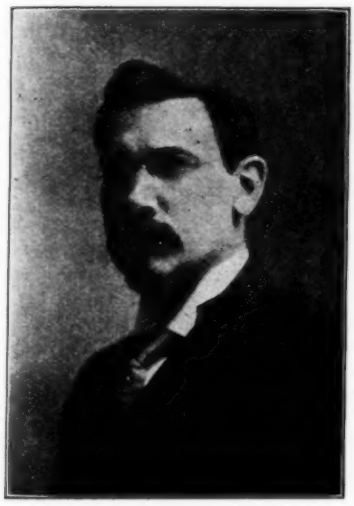
Methods of Administering Drugs to Obtain Most Rapid and Best Results *

By William C. Anderson, Ph.G., Phar.D.
DEAN OF THE BROOKLYN COLLEGE OF PHARMACY

I am confident that it will not be necessary for me to enter into any discussion with this body with reference to the value of drugs and their continued use in the practice of medicine, for while we concede to the drugless healer the right of expression of opinion and taking advantage of that same right we declare that his opinion is at variance with long and well established experience, the most scientific investigation and the most thorough knowledge, I believe we are agreed that drugs of the animal, the vegetable and the mineral kingdom will continue to be, as they always have been, important factors in the prevention, the alleviation and the cure of affliction and disease. So if drugs are to be used, the fact that there are various varieties of drugs and drugs of different qualities that may be obtained and our knowledge of the fact that, like power, like money, like talent, like education, drugs may be used for ill as well as for good, prompts a number of queries, the most important of which is, first, what kind, or character, of drugs shall be employed, or administered? Second, What is the best form in which these drugs can be made in order to secure the most prompt and effectual result? Third, if I have time to take up that topic at any length, By whom or under whose supervision or direction shall drugs be prepared and administered?



In answering this first query we are most fortunate in having at our command our national books of standards for drugs—The United States Pharmacopoeia and the National Formulary. With few exceptions, such as the recent discoveries and a few drugs of proved value that are marketed under patented or trade mark rights, these two books contain a list of drugs that constitute the kind and character of drugs that should be used in the practice of medicine. Standards for drugs are absolutely essential in regulating proper dosage and reliability.

The United States Government, as well as every state in the Union, recognize by law the standards for drugs as laid down in these two books and as proved by formula and test.

Rigid investigation in the form of inspection is continually in progress in order to ascertain that these standards are complied with by those who have the right to handle drugs, either in sale to the public or in compounding them on physician's prescriptions. In our own state last year's report shows that of the more than 10,000 inspections made there was less than 5½ per cent of alleged violations of the law. These inspections include the inspecting of stores that are reported as handling drugs without a license, as well as the inspection of pharmacies and drug stores. They include inspection with reference to unlicensed or incompetent people having charge of such places and selling drugs, and the collection of samples that are analyzed and a report made as to their quality and strength. Consequently, when you eliminate the inspection of places that have no right to handle drugs and the inspection of unlicensed persons selling drugs from these violations, it reduces the violations with reference to the quality of drugs, to a minimum, and in hardly any instance is it ever discovered that any of these violations were intentional. Remember that a violation is recorded and reported even if the strength of the preparation varies a very small amount. Camphorated Oil that is 17 per cent in strength, instead of the official 20, would be reported as a violation. So it is pretty good proof that the physician can depend upon the drugs and preparations which he secures upon his prescription for the use of his patients.

Origin of the Pharmacopoeia

The United States Pharmacopoeia came into existence because of the desire on the part of physicians to elevate what was in olden times rather a trade, or an unscientific practice based upon much doubt and uncertainty, to a true scientific profession based upon standards, drugs of standard and quality. We should be very proud of the fact that the pharmacopoeia originated in our own city of New York. Prior to 1817 there were some small books, called pharmacopoeias, which were only recipe books, that were published in different parts of the country, particularly in Philadelphia, for the use of the Army and Navy; but it was not until the year of 1817 when Dr. Lyman Spalding proposed to the Medical Society of the County of New York that a committee be appointed to prepare a national pharmacopoeia that we saw, or rather they saw the possibility of this official book being prepared. I will not take the time to go into a detailed description of what Dr. Spalding's plans were. It is sufficient to say that in a short time, or what would be considered a short time in those days, considering the inconvenience of travel, etc., a national pharmacopoia was compiled and published in Boston, December 15, 1820, in both the Latin and the English language.

This pharmacopoeia, as well as that of 1830, was the work of physicians only. It was not until the revision of 1840 that pharmacy took any part in the making of the pharmacopoeia, and at that date the pharmacy schools were simply asked to cooperate. Delegates of pharmacy were not admitted to the convention for the revision of the pharmacopoeia until 1850. However, after the precedent had been established of revising the pharmacopoeia once in ten years (a plan still carried out), it was determined that the convention for the revision of the pharmacopoeia should be composed of delegates from the medical societies and the medical colleges throughout the United States, the pharmacy colleges, and the Pharmaceutical Associations, a plan that has always been continued. As the number of delegates at these conventions became very large, it was impossible to have final action on all the details of the proposals to delete some things from the pharmacopoeia and add others, so it was necessary that the actual work of carrying out the will of the convention, the decision of the delegates, should be referred to a smaller number, and a committee, known as the Committee of Revision, was appointed and still carries out the will of the convention that is brought together for the revision of the pharmacopoeia.

On that committee at least 50 per cent are always physicians, consequently I want to call your attention to the fact that when we consider the pharmacopoeia it is really a physicians' book, originated by physicians for their benefit, and the physicians have the power to regulate what shall be included in the pharmacopoeia and what shall be eliminated from it.

* Lecture delivered before the Medical Society of the County of Kings, Brooklyn, N. Y., April 8, 1927

The National Formulary, the other book of standards, we also had the honor of originating in New York City, in 1873.

The Genesis of the National Formulary

Dr. Anderson now referred to literature that was being issued about this time by drug-manufacturing houses, advocating certain varieties of drugs that were non-standard, that this literature was at times misleading and that, consequently, because the drugs which were advocated at this time were non-standard in character, the pharmacists, through a committee of the King County Pharmaceutical Society, the German Apothecary Society, and the New York College of Pharmacy provided for a small book of formulas in order that physicians would have standard formulas and be familiar with the ingredients in each whenever they were prescribed for their patients. Continuing the doctor said:—

"This was known as the New York and Brooklyn Formulary. In 1878 the American Pharmaceutical Association took over this book and made it a national book, and ever since it has been published through the authority and by a committee appointed by the American Pharmaceutical Association as the National Formulary."

This book, the National Formulary (I wish I had time to go a little more into detail with reference to each, but I have not) is primarily a book of formulas, although the latest edition contains many drugs that in order to reduce the size of the Pharmacopœia, which has now grown to some extent, and to make it handy to use, were deleted from the Pharmacopœia, but made official in the National Formulary.

It is just as essential that standard compound drugs, or standard preparations, shall be employed in the practice of medicine as it is that standard drugs, simple drugs, or crude drugs, shall be employed, for the fundamental principle in each instance is that the physician shall have full knowledge of the drug, or drugs, his patient is taking, and he can only have that knowledge when drugs and preparations that are standard, in which the formula is published and strictly adhered to, are used..

Value of Standards

These standards are of extreme value, as every physician can realize. Physicians quite generally, except perhaps in a few instances, like the combination of atropine and morphine, rigidly avoid bringing together drugs that are therapeutically antagonistic, or prescribing drugs that while they will be beneficial to one organ of the body—perhaps the affected organ—will be directly harmful to another organ of the body. Unstandard preparations or non-standard preparations, may have the potent ingredients, of such preparations printed upon the label of the container, or the advertising matter of such preparation. Such printing, however, is not an absolute guarantee that the drugs mentioned are the only ones contained in that preparation. There may be, for the purpose of clarifying, stabilizing or beautifying that preparation, other drugs placed in it that do not appear on the label. Such drugs may change the nature of some of the ingredients without the knowledge of the physician, and in many instances such drugs may be of a character that the physician would not knowingly give them to his patient.

In order to emphasize this point I want to call attention to a very common prescription, sulphate of codeine and syrup of tolu. That combination has been used and prescribed by many physicians for many years and until recently we have not had any trouble with the stability of it or the clearness of the solution, as it has always made a perfectly clear preparation without any precipitation. Several inquiries have come to us recently as to the reason why a precipitate was found in this combination, and upon inquiry we found that the syrup of tolu was purchased and that it was made with a preparation known as soluble tolu. We know that tolu as a balsam is not soluble in water to any great extent. Certain constituents of it are, but ordinarily a preparation of tolu, made as it is with strong alcohol, will not make a clear solution with water solutions such as simple syrup. It is claimed that soluble tolu made a clear solution when mixed with simple syrup. The label indicated that tolu was the only drug in the preparation. Still it was apparent that some other drug, possibly an alkali or drug having similar action, was used to make the preparation perfectly miscible with the syrup. Alkalies are incompatible with the salts of the alkaloids, they neutralize the acid constituent and precipitate the true alkaloids. Consequently in the prescription referred to the codeine is thrown out of solution, making a preparation that many physicians would not want to give their patient, because even on shaking there is a question as to whether the division of the dose would be properly secured.

There are many other instances that I might call attention to along the same line where we are not sure of the constituents in unstandard preparations.

Best Form of Preparation

The second query that we have spoken of is the best form of preparation in which drugs can be made in order to get the most prompt action and effectual results. There are many different forms, and in selecting the best we would have to visualize the physician when he diagnosed the case and decided upon the drug, or drugs, which he wants to give his patient, and find him faced with the propositions first, what form of preparation can he order this drug to be made into that will enable it to be assimilated most quickly. That is one of the first things in mind, I think, and, secondly, what can he combine it with that will make this preparation palatable? The next consideration would probably be, what incompatibilities may occur between the ingredients ordered, in the form of preparation that I would have it made into? Still another consideration would be, what will be the psychological effect upon the patient when this form of preparation is presented to him? Just how will it affect him? Will it create confidence in the patient that it is going to do some good, or will there be a rebellious feeling because of the fact that he has had so many things that look alike such as gelatin-coated pills that can be purchased on the market and in which the confidence of the patient has to a great extent been destroyed?

In considering the first of these propositions the readiness with which the drug will be assimilated in the form of preparation prescribed. We must recognize the fact that drugs where the solubility and dose warrant, will be assimilated most quickly when given in the form of solution, and, therefore, the mind of the physician would turn to a solution in these instances.

In selecting a solvent in making a solution of a drug, consideration must be given to the therapeutic effect or some other objectionable effect of the solvent used. Take chloroform and ether, for instance. You would not think of using solutions in chloroform or ether because of the therapeutic effect when they are taken in concentrated form and the fact, that you could not destroy that hot, burning, irritating taste of the concentrated liquids by dilution because of their non-miscibility to any great extent with water. Chloroform will mix with water in a very small proportion; ether a little more miscible, but not sufficient for satisfactory dilution. When alcohol is the solvent, even though there may be some objection to its stimulating effects, its miscibility with water in any proportion makes it possible to give the solution in teaspoonful or tablespoonful doses and so dilute it with water that the hot and irritating effects of the alcohol would be overcome.

Then we have the aqueous solutions, which are perhaps the most prominent along this line. The only objection to the water solution would be that water is not antiseptic, and aqueous solutions of drugs, even inorganic drugs at times, do not keep a great length of time without spoiling. At the same time the average prescription is for such small quantities that it is used by the patient in a few days, and this feature would not be considered an objectionable one.

Solubility of Drugs

When the physician orders a drug in solution, he is troubled at times because of the necessity of remembering so many solubilities. It is difficult to remember the exact amount of water that will dissolve each drug. I believe he can be relieved a great deal of the trouble in this line if he would simply have in mind

the general solubility in the two great solvents—water and alcohol —of the very common inorganic drugs, because the organic drugs, when prescribed, or used in solution, are either in the form of infusions or decoctions, when made fresh, or of preparations, ready-made preparations, that are kept in the form of tinctures, fluidextracts, elixirs, etc. So if the physician has in mind the general solubility of the commonly used inorganic drugs, his trouble is overcome. Take acetates, for instance, they are soluble in both water and alcohol, but water is preferable as a solvent. Citrates are soluble in water, but insoluble in alcohol. So that when the mind is fixed on a citrate the physician will know that water is the solvent and not alcohol under any circumstances. Usually there are exceptions to the rule. For example, citrate of bismuth is insoluble in water, but the ammonium citrate is very soluble in water.

Bromides are soluble in both water and alcohol, with water preferred.

Iodides are soluble in both liquids, with water again preferred. The exceptions with reference to the iodides are, the iodid of silver, which is not soluble in either liquid, the yellow iodide of mercury, which is insoluble in both alcohol and water, and the red iodide of mercury, which is insoluble in water, and only slightly soluble in alcohol.

Then we have the chlorides, soluble in both, with water preferred, except in the case of bichloride of mercury, it being more soluble in alcohol than it is in water. Chloride of sodium, the common chloride, is almost insoluble in alcohol but freely soluble in water, and the mild chloride of mercury, or calomel, the important exception; that must be kept in mind: insoluble in both liquids.

Then we have the valerianates, which are soluble in both, but in this case alcohol is the better solvent. Valerianate of iron (that is used quite extensively) is practically insoluble in water, but freely soluble in alcohol.

The carbonates as a class are insoluble in both liquids, except the carbonate of lithium and the carbonate and bicarbonate of sodium and potassium, which are soluble in water. Carbonate of ammonium is freely soluble in water, but decomposed by alcohol, because it is a double salt composed of the acid carbonate of ammonium and the carbonate of ammonium. The alcohol dissolving the carbonate but precipitating the acid carbonate.

Cyanides: water is the best solvent for cyanides. Cyanide of silver is insoluble in both liquids.

Sulphates, except those of the alkaloids, are insoluble in alcohol but soluble in water.

The true alkaloids while soluble in both liquids, usually are much more freely soluble in alcohol, while the salts of the alkaloids, sulphates for instance, are more soluble in water than in alcohol.

The chief exception is sulphate of quinine, that is more soluble in alcohol than in water.

Water is the best solvent for chlorates.

Chlorate of potassium is almost insoluble in alcohol.

Nitrates are soluble in water but quite insoluble in alcohol. The exceptions are nitrate of silver and nitrate of ammonium which are quite soluble in alcohol. Subnitrate of bismuth is insoluble in both liquids.

Suitable Vehicles

Oxides are insoluble in both liquids and are seldom used internally and when so used are in the form of a mixture, pill or powder. While drugs are readily assimiliated, when in solution, we find that solutions, as a rule intensify the taste of the drug. Therefore, if a drug has a disagreeable or objectionable taste and is made into a solution, the taste must be modified or covered by the use of a corrective or vehicle. Different drugs require different vehicles for covering the taste or disguising it to a certain extent. There are some general rules that may be laid down, as, for instance, saline, or salty, drugs have their taste best covered by such vehicles as syrup of citric acid, syrup of orange or syrup of raspberry. With sour drugs, syrup of wild cherry may be used and is a very good covering medium. If drugs are bitter, care must be taken not to combine with them as a vehicle or attempt to cover their bitter taste by the use of simple sweets. Simple syrup, for instance, with a bitter drug only intensifies it, or forms a taste that is more disagreeable than that of the bitter taste itself. Syrups, however, such as syup of licorice and syrup of yerba santa that contain constituents that have a prominent and tenacious flavor that disguises the intense sweetness, cover very acceptably the bitter taste of many drugs.

The physician should avoid using the same vehicle for all his prescriptions, for that gives the impression that he is giving the same medicine to every patient. It is particularly so with reference to the medicine given in the same family where the taste of the drug has to be covered. In these instances use one vehicle that will have one color and another color for different members of the family, sometimes prevents mistakes.

The best form for rapid assimilation, particularly with insoluble drugs, is the form of mixture, or emulsion. An emulsion properly prepared is one of the best forms for oils, and in combination with the oils we can use a solution of acetate of potash, hypophosphites or other drugs, dissolved in the water or oil that is used in making the emulsion.

If the drug is of such a nature that it cannot be made into solution or an emulsion or mixture, there are many other forms in which it may be prescribed or administered. Perhaps one of the most common forms is that of powder. There are different ways of prescribing or ordering drugs to be given in the form of powder. Powder in bulk, placed in jars or bottles and given in teaspoonful or half-teaspoonful doses mixed with water, or taken on the tongue and then followed by water, is one of the common forms.

Another form is that of the chartulae or papers, dividing the powdered drug and inclosing in papers; and another very nice form, which physicians do not use to an extent its advantages warrant but which is one of the very best forms of covering the taste of the drug to be taken in powdered form, is the use of konseals, in which the powder is placed inside the konseal which is then securely sealed. In questioning quite a number of physicians with reference to this form of covering, they informed me that they had never heard of it. The konseal of convenient form and made of flour paste is just dropped into a half a glass of water when it softens and is easily swallowed, or is placed on the tongue with a little water following it, and it is taken very readily and with pleasant memories.

Another form is the powder in the gelatin capsule: that is, the hard gelatin capsule. These capsules you are familiar with. You know that they come in different sizes and can contain different quantities of the powder. Where the dose is not too large, this is perhaps one of the most acceptable ways of administering powdered drugs.

While I am speaking of the gelatin capsules, I want to call attention to the fact that it is not only the powdered drug that may be properly made and enclosed in the gelatin capsule that has the advantage of covering the taste of the drug and is readily soluble when administered for these capsules are most convenient for inclosing the pill mass, when instead of rolling it into a pill, the mass is made into a cylinder and placed inside the gelatin capsule and sealed. This is a splendid way of covering the disagreeable taste of freshly made pills where drugs with a disagreeable taste are included. Liquids that will not dissolve or destroy gelatin may be dispensed in these capsules by simply placing the liquid inside and sealing so there is no leakage, we can also place therein a combination of powder and liquid, which makes a nice combination. Even the tablet triturate may be enclosed in gelatin capsules with liquid and makes a very nice way of administering some drugs.

We also have the method of introducing various drugs into a soft gelatin capsule. Powders and liquids or other liquid combinations are most conveniently and securely enclosed in this

way, the elasticity of the soft capsule having some advantages over the hard gelatin capsules, particularly the large sizes as they are swallowed much more easily than the hard variety.

Then we have the compressed tablet, which is simply that form in which the powdered drug is compressed into tablet form. The tablet triturate and the troche, as well as the pill of which we have samples here.

Dean Anderson then exhibited samples of each form of preparation to which he had referred.

I will not take the time to go into detail with reference to the preparation of each of these.

Value of Freshly Prepared Preparations

Whatever form these different drugs are prescribed in, I want to emphasize the value of the freshly prepared preparations. It makes no difference whether it is the pill mass, or the compressed tablet, or the tablet triturate, or the soft or hard gelatin capsule, the effects of these drugs must be secured more quickly when they are freshly prepared. Take, for instance, the tablet triturate, that is a very popular form of administering drugs, when kept for some time, it becomes very hard. I have some samples here of tablet triturates containing the same drug and in equal quantities, some of which are almost blue, others black, others yellow. If this form of preparation is kept for some time, particularly those containing drugs that are readily affected by light and air such as, yellow iodide of mercury, iodide of arsenic, and many other drugs, they not only become very hard and do not dissolve readily, but the drug they contain is changed chemically and therapeutically. While a freshly prepared tablet triturate is readily dissolved in water or will disintegrate very quickly. For instance, here is an old tablet which should be yellow in color. It is yellow iodide of mercury. If I place this in a test tube with water and agitate or shake it very thoroughly, it will not disintegrate. If I strike it with a rod and eventually break it up, we find a deep green or black colored liquid rather than a true yellow color that should be produced.

On the other hand, if we take a freshly prepared tablet triturate of the same drug, containing the same quantity and place it in a test tube with water we will find, using the same quantity of the water, it will disintegrate very quickly; it requires only a little, if any, agitation in this instance when the triturate begins to break up, and the mixture is of the proper color that yellow iodide of mercury should give. The doctor made this experiment while he was talking.

The point I want to make, as you can realize, is, that while tablet triturates are fine forms to prescribe medicine in, the old dry tablet triturate becomes hard, insoluble and decomposes because of the chemical change that takes place in the drug, and they should be used in the freshly prepared form, especially as the making of 50 or 100 of them does not take the average pharmacist, as long as it does to make a dozen ordinary pills. What I have said of tablet triturates is equally true of compressed tablets.

I am simply suggesting that physicians can get the true effect of these drugs by prescribing them in the freshly made condition.

The soft gelatin capsule is another form of preparation that is very nice to use, but if we take the old soft gelatin capsules that have stood a long time and should contain the proper amount of drug, in a liquid form they are found to be hard and almost insoluble. I can crush them, with much effort, but as I break them there is nothing inside.

The doctor now referred to liquids which are used in combination with other drugs and placed in soft gelatin capsules and become absorbed by the gelatin after standing for a length of time, and added:—

Drugs, if taken in this form, cannot possibly have the effect of a freshly prepared soft gelatin capsule such as these I have here which are freshly prepared with the ingredients placed in them and sealed securely.

I have other examples along the same line, such as granular effervescent salts that become dead or lose their effervescent property on standing a length of time. Effervescent salts can be made in a short time in almost any combination, and should be used in the freshly prepared form.

The psychological effect of the form and appearance of the medicine to be taken upon the patient should not be underestimated.

The confidence of the patient in the prescriber and in the remedy prescribed apparently have a decided and very important influence in giving relief and effecting a cure.

Most patients expect and appreciate a different form of medicine pursuant to their physician's order that they are accustomed to purchase without the examination and advice of such physician.

A factor of great importance is the question of incompatibility. That is a very large subject. I am not at liberty, with the time at my disposal, to even touch upon it, except as it may be referred to in connection with a few prescriptions I have here and which I wish to present as illustrations of the proper and improper use of drugs in combination.

The only change I have made in these prescriptions from the original writing is the use of official abbreviations.

The pharmacopoeia, as you may remember, for the last two revisions has recommended and placed in the text of the book official abbreviation as a guide to physicians in writing for drugs.

This is the first prescription I wish to call attention to:

℞	Quinin. Sulph.	Gr. x
	Acid Sulph. Dil.	q.s.
	Tinct. Nuc. Vom.	M. x
	Syr. Zingib.	℥i
	Aquae	℥i
	M. et fiat solutio.	
	Sig.: Coch. parv. T. I. D.	

This is what may be called a typical prescription with all the parts of the prescription, the superscription or ℞, the inscription or ingredients and the quantities of same, the subscription or designation of the form of preparation to be made and the signature or directions for administration.

Quinine sulphate the base or most active ingredient, dilute sulphuric acid as a solvent for the base, tincture of nux vomica as the adjuvant or auxiliary, syrup of ginger as the corrective and water as the diluent.

This shows the proper use of dilute sulphuric acid. It produces a complete solution of the sulphate of quinine without affecting the chemical, physical or medical properties of the other ingredients.

Incompatibilities

℞	Quinin. Sulph.	℥i
	Acid Sulph. Dil.	q.s.
	Pot. Acet.	℥i
	Syrupi	℥ss
	Aq.	q.s. ℥ii
	M. Ft. Sol.	
	Sig.: ℥i P.C.	

COMMENT:—This shows an improper or unnecessary use of dilute sulphuric acid for there occurs an unintentional chemical incompatibility in that the physician did not intend to produce acetate of quinine. This salt, however, is produced and is of such a nature that with insufficient liquid to dissolve it, it forms a thick, white precipitate that cannot be poured from the container.

The physicians order that a solution be made, as shown in the subscription, cannot be carried out and the prescription cannot be dispensed.

℞	Quin. Sulph.	.5
	Sod Salicyl.	1.
	Acid Sulph. Dil.	2.
	Aquae q.s.	30.
	M. ft. sol.	
	Sig: Guttae xx omn. 4 hor.	

COMMENT:—Again we have the improper use of dilute sulphuric acid for in this prescription the sulphuric acid while it answers the purpose of dissolving the sulphate of quinine, decomposes the sodium salicylate, separating the salicylic acid